

No. 22-____

**UNITED STATES COURT OF APPEALS FOR THE
FEDERAL CIRCUIT**

IN RE GOOGLE LLC,
Petitioner

On Petition for a Writ of Mandamus to the
United States District Court for the Western District of Texas,
No. 6:21-cv-00259-ADA
Hon. Alan D. Albright

**NONCONFIDENTIAL APPENDIX TO PETITION FOR WRIT OF
MANDAMUS**

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October 15, 2021

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(Filed Under Seal; Contains Confidential Materials)

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CONFIDENTIAL MATERIAL OMITTED

The material omitted from the Nonconfidential Appendix includes confidential information relating to business practices and other commercially sensitive information of Petitioner and Plaintiffs. This material is subject to the district court's Standing Order Regarding Filing Documents Under Seal and Redacted Public Versions (October 13, 2021) and was redacted from public filings in the district court. For material that is part of the record and had a sealed and a public version of a document, the Confidential Appendix includes the sealed version and the Nonconfidential Appendix includes the public version. In the Confidential Appendix, confidential material is highlighted in light blue, which corresponds to the redacted portions of the public versions. Material that is highlighted in yellow in both versions of the appendix was highlighted in those materials as submitted to the district court.

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

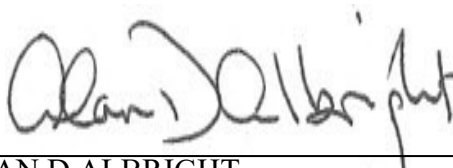
**STANDING ORDER REGARDING
FILING DOCUMENTS UNDER SEAL AND REDACTED PUBLIC VERSIONS**

This Order shall apply in all patent cases pending before the undersigned. As a public forum, the Court has a policy of providing to the public full access to documents filed with the Court. Nevertheless, parties in patent cases routinely produce and rely on information that is confidential. Therefore, in all patent cases pending before the undersigned, the Court hereby grants leave for any party to file materials containing confidential information under seal without filing a separate motion seeking leave of the Court to do so.

The filing party shall file a publicly available, redacted version of any motion or pleading filed under seal within seven days. The parties need not file redacted versions of exhibits to such documents. Exhibits that are nonconfidential in their entirety should not be filed under seal at all. The parties shall coordinate to make sure that the publicly available version redacts information that any party deems confidential. Redactions should be targeted to redact only that information. The publicly available version shall be labeled "PUBLIC VERSION." Cooperating to file the publicly available version shall not be deemed as agreeing that the redacted information is confidential.

When this Court enters an order resolving a motion in which one or more of the parties filed briefing under seal, the Court will enter its order under seal. The movant shall follow the above protocol and file a publicly available, redacted version of the Court's sealed order within seven days after the Court enters the sealed order.

SIGNED this 13th day of October, 2021.

A handwritten signature in black ink, appearing to read "Alan D Albright", is written over a horizontal line.

ALAN D ALBRIGHT
UNITED STATES DISTRICT JUDGE

**U.S. District Court [LIVE]
Western District of Texas (Waco)
CIVIL DOCKET FOR CASE #: 6:21-cv-00259-ADA**

Super Interconnect Technologies LLC v. Google LLC
Assigned to: Judge Alan D Albright
Cause: 35:271 Patent Infringement

Date Filed: 03/15/2021
Jury Demand: Both
Nature of Suit: 830 Patent
Jurisdiction: Federal Question

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Date Filed	#	Docket Text
03/15/2021	<u>1</u>	COMPLAINT <i>FOR PATENT INFRINGEMENT</i> (Filing fee \$ 402 receipt number 0542-14591102), filed by Super Interconnect Techonologies LLC. (Attachments: # <u>1</u> Civil Cover Sheet, # <u>2</u> Exhibit A, # <u>3</u> Exhibit B, # <u>4</u> Exhibit C)(Bragalone, Jeffrey) (Entered: 03/15/2021)
03/15/2021	<u>2</u>	REQUEST FOR ISSUANCE OF SUMMONS by Super Interconnect Techonologies LLC. (Bragalone, Jeffrey) (Entered: 03/15/2021)
03/15/2021		All parties shall comply with the Standing Orders of Judge Alan D. Albright located at https://www.txwd.uscourts.gov/judges-information/standing-orders/ . (lad) (Entered: 03/15/2021)
03/15/2021	<u>3</u>	Notice of Filing of Patent/Trademark Form (AO 120). AO 120 forwarded to the Director of the U.S. Patent and Trademark Office. (Bragalone, Jeffrey) (Entered: 03/15/2021)
03/15/2021		Case assigned to Judge Alan D Albright. CM WILL NOW REFLECT THE JUDGE INITIALS AS PART OF THE CASE NUMBER. PLEASE APPEND THESE JUDGE INITIALS TO THE CASE NUMBER ON EACH DOCUMENT THAT YOU FILE IN THIS CASE. (lad) (Entered: 03/15/2021)
03/15/2021	<u>4</u>	Certificate of Interested Parties by Super Interconnect Techonologies LLC. (Bragalone, Jeffrey) (Entered: 03/15/2021)
03/15/2021	<u>5</u>	Summons Issued as to Google LLC. (lad) (Entered: 03/15/2021)
03/16/2021	<u>6</u>	NOTICE of Attorney Appearance by Jack Wesley Hill on behalf of Super Interconnect Techonologies LLC. Attorney Jack Wesley Hill added to party Super Interconnect Techonologies LLC(pty:pla) (Hill, Jack) (Entered: 03/16/2021)
03/16/2021	<u>7</u>	NOTICE of Attorney Appearance by Daniel F. Olejko on behalf of Super Interconnect Techonologies LLC (Olejko, Daniel) (Entered: 03/16/2021)
03/16/2021	<u>8</u>	NOTICE of Attorney Appearance by Jerry D. Tice, II on behalf of Super Interconnect Techonologies LLC (Tice, Jerry) (Entered: 03/16/2021)
03/17/2021	<u>9</u>	SUMMONS Returned Executed by Super Interconnect Techonologies LLC. Google LLC served on 3/16/2021, answer due 4/6/2021. (Bragalone, Jeffrey) (Entered: 03/17/2021)
03/29/2021	<u>10</u>	NOTICE of Attorney Appearance by J. Mark Mann on behalf of Google LLC. Attorney J. Mark Mann added to party Google LLC(pty:dft) (Mann, J.) (Entered: 03/29/2021)
03/29/2021	<u>11</u>	Unopposed MOTION for Extension of Time to File Answer re <u>1</u> Complaint, by Google LLC. (Attachments: # <u>1</u> Proposed Order)(Mann, J.) (Entered: 03/29/2021)
03/29/2021	<u>12</u>	NOTICE of Attorney Appearance by G. Blake Thompson on behalf of Google LLC. Attorney G. Blake Thompson added to party Google LLC(pty:dft) (Thompson, G.) (Entered: 03/29/2021)
03/30/2021		Text Order GRANTING <u>11</u> Motion for Extension of Time to Answer entered by Judge Alan D Albright. The Court, having considered the unopposed motion of Defendant, Google LLC, (Defendant) to move, answer, or otherwise respond to the Complaint hereby ORDERS that the motion is GRANTED. Defendants deadline to respond to the Complaint is extended to and including April 27, 2021. (This is a text-only entry generated by the court. There is no document associated with this entry.) (ep4) (Entered: 03/30/2021)
03/30/2021		Reset Deadlines: Google LLC answer due 4/27/2021. (lad) (Entered: 03/30/2021)

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04/15/2021	<u>13</u>	Second MOTION for Extension of Time to File Answer re <u>1</u> Complaint, by Google LLC. (Attachments: # <u>1</u> Proposed Order)(Mann, J.) (Entered: 04/15/2021)
04/23/2021		Text Order GRANTING <u>13</u> Motion for Extension of Time to Answer entered by Judge Alan D Albright. The Court, having considered Defendant, Googles unopposed second motion to additionally extend the time for it to move, answer, or otherwise respond to the Plaintiffs Complaint, hereby GRANTS the motion and ORDERS that Defendant, Googles deadline to answer or otherwise respond to Plaintiffs Complaint is May 21, 2021. (This is a text-only entry generated by the court. There is no document associated with this entry.) (ep4) (Entered: 04/23/2021)
04/23/2021		Reset Deadlines: Google LLC answer due 5/21/2021. (bw) (Entered: 04/23/2021)
04/27/2021	<u>14</u>	Sealed Motion Motion to Transfer Venue to the Northern District of California Under 28 U.S.C. § 1404(a) by Google LLC (Attachments: # <u>1</u> Declaration of Mark Liang, # <u>2</u> Exhibit 9, # <u>3</u> Exhibit 10, # <u>4</u> Exhibit 11, # <u>5</u> Exhibit 12, # <u>6</u> Exhibit 13, # <u>7</u> Exhibit 14, # <u>8</u> Exhibit 17, # <u>9</u> Exhibit 18, # <u>10</u> Exhibit 19, # <u>11</u> Exhibit 22, # <u>12</u> Exhibit 27, # <u>13</u> Exhibit 29, # <u>14</u> Declaration of Andre Golueke) (Mann, J.) (Entered: 04/27/2021)
04/27/2021	<u>15</u>	ATTACHMENT <i>Additional Attachments</i> to <u>14</u> Sealed Motion Motion to Transfer Venue to the Northern District of California Under 28 U.S.C. § 1404(a) by Google LLC by Google LLC. (Attachments: # <u>1</u> Exhibit 1, # <u>2</u> Exhibit 2, # <u>3</u> Exhibit 3, # <u>4</u> Exhibit 4, # <u>5</u> Exhibit 5, # <u>6</u> Exhibit 6, # <u>7</u> Exhibit 7, # <u>8</u> Exhibit 8, # <u>9</u> Exhibit 15, # <u>10</u> Exhibit 16, # <u>11</u> Exhibit 20, # <u>12</u> Exhibit 21, # <u>13</u> Exhibit 23, # <u>14</u> Exhibit 24, # <u>15</u> Exhibit 25, # <u>16</u> Exhibit 26, # <u>17</u> Exhibit 28, # <u>18</u> Exhibit 30, # <u>19</u> Exhibit 31, # <u>20</u> Exhibit 32, # <u>21</u> Exhibit 33, # <u>22</u> Exhibit 34, # <u>23</u> Exhibit 35, # <u>24</u> Exhibit 36, # <u>25</u> Exhibit 37, # <u>26</u> Exhibit 38, # <u>27</u> Exhibit 39, # <u>28</u> Exhibit 40, # <u>29</u> Exhibit 41, # <u>30</u> Proposed Order)(Mann, J.) (Entered: 04/27/2021)
04/27/2021	<u>16</u>	MOTION to Stay <i>Pending Decision on Google LLC's Motion to Transfer</i> by Google LLC. (Attachments: # <u>1</u> Declaration of Mark Liang, # <u>2</u> Exhibit 1, # <u>3</u> Exhibit 2, # <u>4</u> Exhibit 3, # <u>5</u> Exhibit 4, # <u>6</u> Exhibit 5, # <u>7</u> Exhibit 6, # <u>8</u> Exhibit 7, # <u>9</u> Exhibit 8, # <u>10</u> Exhibit 9, # <u>11</u> Proposed Order)(Mann, J.) (Entered: 04/27/2021)
04/27/2021	<u>17</u>	Pro Hac Vice Letter to Darin W. Snyder, David S. Almeling, Mark Liang, Sorin G. Zaharia and Daniel Silverman. (lad) (Entered: 04/27/2021)
04/29/2021	<u>18</u>	MOTION to Appear Pro Hac Vice by J. Mark Mann <i>for David Almeling</i> (Filing fee \$ 100 receipt number 0542-14753034) by on behalf of Google LLC. (Attachments: # <u>1</u> Proposed Order)(Mann, J.) (Entered: 04/29/2021)
04/29/2021	<u>19</u>	MOTION to Appear Pro Hac Vice by J. Mark Mann <i>for Amy K. Liang</i> (Filing fee \$ 100 receipt number 0542-14753074) by on behalf of Google LLC. (Attachments: # <u>1</u> Proposed Order)(Mann, J.) (Entered: 04/29/2021)
04/29/2021	<u>20</u>	MOTION to Appear Pro Hac Vice by J. Mark Mann <i>for Mark Liang</i> (Filing fee \$ 100 receipt number 0542-14753089) by on behalf of Google LLC. (Attachments: # <u>1</u> Proposed Order)(Mann, J.) (Entered: 04/29/2021)
04/29/2021	<u>21</u>	MOTION to Appear Pro Hac Vice by J. Mark Mann <i>for Daniel Silverman</i> (Filing fee \$ 100 receipt number 0542-14753108) by on behalf of Google LLC. (Attachments: # <u>1</u> Proposed Order)(Mann, J.) (Entered: 04/29/2021)
04/29/2021	<u>22</u>	MOTION to Appear Pro Hac Vice by J. Mark Mann <i>for Luann L. Simmons</i> (Filing fee \$ 100 receipt number 0542-14753128) by on behalf of Google LLC. (Attachments: # <u>1</u> Proposed Order)(Mann, J.) (Entered: 04/29/2021)
04/29/2021	<u>23</u>	MOTION to Appear Pro Hac Vice by J. Mark Mann <i>for Darin W. Snyder</i> (Filing fee \$ 100 receipt number 0542-14753144) by on behalf of Google LLC. (Attachments: # <u>1</u> Proposed

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		Order)(Mann, J.) (Entered: 04/29/2021)
04/29/2021	<u>24</u>	MOTION to Appear Pro Hac Vice by J. Mark Mann <i>for Sorin Zaharia</i> (Filing fee \$ 100 receipt number 0542-14753165) by on behalf of Google LLC. (Attachments: # <u>1</u> Proposed Order)(Mann, J.) (Entered: 04/29/2021)
05/03/2021	<u>25</u>	NOTICE of Attorney Appearance by Terry A. Saad on behalf of Super Interconnect Techonologies LLC. Attorney Terry A. Saad added to party Super Interconnect Techonologies LLC(pty:pla) (Saad, Terry) (Entered: 05/03/2021)
05/03/2021	<u>26</u>	Unopposed MOTION for Extension of Time to File Response/Reply by Super Interconnect Techonologies LLC. (Attachments: # <u>1</u> Proposed Order Proposed Order) (Saad, Terry) (Entered: 05/03/2021)
05/04/2021	<u>27</u>	Redacted Copy of <u>14</u> Sealed Motion Motion to Transfer Venue to the Northern District of California Under 28 U.S.C. § 1404(a) by Google LLC by Google LLC. (Attachments: # <u>1</u> Declaration of Mark Liang, # <u>2</u> Exhibit 9, # <u>3</u> Exhibit 10, # <u>4</u> Exhibit 11, # <u>5</u> Exhibit 12, # <u>6</u> Exhibit 13, # <u>7</u> Exhibit 14, # <u>8</u> Exhibit 17, # <u>9</u> Exhibit 18, # <u>10</u> Exhibit 19, # <u>11</u> Exhibit 22, # <u>12</u> Exhibit 27, # <u>13</u> Exhibit 29, # <u>14</u> Declaration of Andre Golueke)(Mann, J.) (Entered: 05/04/2021)
05/04/2021	<u>28</u>	ORDER GRANTING <u>26</u> Motion for Extension of Time to File Response/Reply Signed by Judge Alan D Albright. (bw) (Entered: 05/04/2021)
05/11/2021		Text Order GRANTING <u>18</u> Motion to Appear Pro Hac Vice for Attorney David S. Almeling for Google LLC. Before the Court is the Motion for Admission Pro Hac Vice. The Court, having reviewed the Motion, finds it should be GRANTED and therefore orders as follows: IT IS ORDERED the Motion for Admission Pro Hac Vice is GRANTED. IT IS FURTHER ORDERED that Applicant, if he/she has not already done so, shall immediately tender the amount of \$100.00, made payable to: Clerk, U.S. District Court, in compliance with Local Rule AT-I (f)(2). Pursuant to our Administrative Policies and Procedures for Electronic Filing, the attorney hereby granted to practice pro hac vice in this case must register for electronic filing with our court within 10 days of this order entered by Judge Alan D Albright. (This is a text-only entry generated by the court. There is no document associated with this entry.) (mm6) (Entered: 05/11/2021)
05/11/2021		Text Order GRANTING <u>19</u> Motion to Appear Pro Hac Vice for Attorney Amy K. Liang for Google LLC. Before the Court is the Motion for Admission Pro Hac Vice. The Court, having reviewed the Motion, finds it should be GRANTED and therefore orders as follows: IT IS ORDERED the Motion for Admission Pro Hac Vice is GRANTED. IT IS FURTHER ORDERED that Applicant, if he/she has not already done so, shall immediately tender the amount of \$100.00, made payable to: Clerk, U.S. District Court, in compliance with Local Rule AT-I (f)(2). Pursuant to our Administrative Policies and Procedures for Electronic Filing, the attorney hereby granted to practice pro hac vice in this case must register for electronic filing with our court within 10 days of this order entered by Judge Alan D Albright. (This is a text-only entry generated by the court. There is no document associated with this entry.) (mm6) (Entered: 05/11/2021)
05/11/2021		Text Order GRANTING <u>20</u> Motion to Appear Pro Hac Vice for Attorney Mark Liang for Google LLC. Before the Court is the Motion for Admission Pro Hac Vice. The Court, having reviewed the Motion, finds it should be GRANTED and therefore orders as follows: IT IS ORDERED the Motion for Admission Pro Hac Vice is GRANTED. IT IS FURTHER ORDERED that Applicant, if he/she has not already done so, shall immediately tender the amount of \$100.00, made payable to: Clerk, U.S. District Court, in compliance with Local Rule AT-I (f)(2). Pursuant to our Administrative Policies and Procedures for Electronic Filing, the attorney hereby granted to practice pro hac vice in this case must register for electronic filing with our court within 10 days of this order

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		entered by Judge Alan D Albright. (This is a text-only entry generated by the court. There is no document associated with this entry.) (mm6) (Entered: 05/11/2021)
05/11/2021		Text Order GRANTING <u>21</u> Motion to Appear Pro Hac Vice for Attorney Daniel Silverman for Google LLC. Before the Court is the Motion for Admission Pro Hac Vice. The Court, having reviewed the Motion, finds it should be GRANTED and therefore orders as follows: IT IS ORDERED the Motion for Admission Pro Hac Vice is GRANTED. IT IS FURTHER ORDERED that Applicant, if he/she has not already done so, shall immediately tender the amount of \$100.00, made payable to: Clerk, U.S. District Court, in compliance with Local Rule AT-I (f)(2). Pursuant to our Administrative Policies and Procedures for Electronic Filing, the attorney hereby granted to practice pro hac vice in this case must register for electronic filing with our court within 10 days of this order entered by Judge Alan D Albright. (This is a text-only entry generated by the court. There is no document associated with this entry.) (mm6) (Entered: 05/11/2021)
05/11/2021		Text Order GRANTING <u>22</u> Motion to Appear Pro Hac Vice for Attorney Luann L. Simmons for Google LLC. Before the Court is the Motion for Admission Pro Hac Vice. The Court, having reviewed the Motion, finds it should be GRANTED and therefore orders as follows: IT IS ORDERED the Motion for Admission Pro Hac Vice is GRANTED. IT IS FURTHER ORDERED that Applicant, if he/she has not already done so, shall immediately tender the amount of \$100.00, made payable to: Clerk, U.S. District Court, in compliance with Local Rule AT-I (f)(2). Pursuant to our Administrative Policies and Procedures for Electronic Filing, the attorney hereby granted to practice pro hac vice in this case must register for electronic filing with our court within 10 days of this order entered by Judge Alan D Albright. (This is a text-only entry generated by the court. There is no document associated with this entry.) (mm6) (Entered: 05/11/2021)
05/11/2021		Text Order GRANTING <u>23</u> Motion to Appear Pro Hac Vice for Attorney Darin W. Snyder for Google LLC. Before the Court is the Motion for Admission Pro Hac Vice. The Court, having reviewed the Motion, finds it should be GRANTED and therefore orders as follows: IT IS ORDERED the Motion for Admission Pro Hac Vice is GRANTED. IT IS FURTHER ORDERED that Applicant, if he/she has not already done so, shall immediately tender the amount of \$100.00, made payable to: Clerk, U.S. District Court, in compliance with Local Rule AT-I (f)(2). Pursuant to our Administrative Policies and Procedures for Electronic Filing, the attorney hereby granted to practice pro hac vice in this case must register for electronic filing with our court within 10 days of this order entered by Judge Alan D Albright. (This is a text-only entry generated by the court. There is no document associated with this entry.) (mm6) (Entered: 05/11/2021)
05/11/2021		Text Order GRANTING <u>24</u> Motion to Appear Pro Hac Vice for Attorney Sorin G. Zaharia for Google LLC. Before the Court is the Motion for Admission Pro Hac Vice. The Court, having reviewed the Motion, finds it should be GRANTED and therefore orders as follows: IT IS ORDERED the Motion for Admission Pro Hac Vice is GRANTED. IT IS FURTHER ORDERED that Applicant, if he/she has not already done so, shall immediately tender the amount of \$100.00, made payable to: Clerk, U.S. District Court, in compliance with Local Rule AT-I (f)(2). Pursuant to our Administrative Policies and Procedures for Electronic Filing, the attorney hereby granted to practice pro hac vice in this case must register for electronic filing with our court within 10 days of this order entered by Judge Alan D Albright. (This is a text-only entry generated by the court. There is no document associated with this entry.) (mm6) (Entered: 05/11/2021)
05/11/2021	<u>29</u>	Response in Opposition to Motion, filed by Super Interconnect Technologies LLC, re <u>16</u> MOTION to Stay <i>Pending Decision on Google LLC's Motion to Transfer</i> filed by Defendant Google LLC (Attachments: # <u>1</u> Exhibit 1)(Bragalone, Jeffrey) (Entered: 05/11/2021)

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05/12/2021	<u>30</u>	Joint MOTION <i>Regarding Case Management and Discovery Into Newly-Released Products</i> by Google LLC. (Attachments: # <u>1</u> Proposed Order)(Mann, J.) (Entered: 05/12/2021)
05/14/2021	<u>31</u>	ORDER GRANTING <u>30</u> Motion regarding CASE MANAGEMENT AND DISCOVERY INTO NEWLY-RELEASED PRODUCTS Signed by Judge Alan D Albright. (lad) (Entered: 05/14/2021)
05/17/2021	<u>32</u>	Joint MOTION for Protective Order by Super Interconnect Techonologies LLC. (Attachments: # <u>1</u> Proposed Order Exhibit A - Protective Order, # <u>2</u> Proposed Order Exhibit B - Supplemental Protective Order re Qualcomm)(Saad, Terry) (Entered: 05/17/2021)
05/18/2021	<u>33</u>	PROTECTIVE ORDER: GRANTING <u>32</u> Motion for Protective Order Signed by Judge Alan D Albright. (lad) (Entered: 05/18/2021)
05/18/2021	<u>34</u>	Response in Opposition to Motion, filed by Super Interconnect Techonologies LLC, re <u>14</u> Sealed Motion Motion to Transfer Venue to the Northern District of California Under 28 U.S.C. § 1404(a) by Google LLC filed by Defendant Google LLC (Attachments: # <u>1</u> Bragalone Declaration, # <u>2</u> Hernandez Declaration, # <u>3</u> Booth Declaration, # <u>4</u> Lucas Declaration, # <u>5</u> Exhibit A, # <u>6</u> Exhibit B, # <u>7</u> Exhibit C, # <u>8</u> Exhibit D, # <u>9</u> Exhibit E, # <u>10</u> Exhibit F, # <u>11</u> Exhibit G, # <u>12</u> Exhibit H, # <u>13</u> Exhibit I)(Bragalone, Jeffrey) (Entered: 05/18/2021)
05/20/2021	<u>35</u>	NOTICE OF JOINT SUBMISSION OF CLAIM CONSTRUCTION RECORD FROM PRIOR CASE by Super Interconnect Techonologies LLC re <u>31</u> Order on Motion for Miscellaneous Relief (Attachments: # <u>1</u> Exhibit A, # <u>2</u> Exhibit B, # <u>3</u> Exhibit C, # <u>4</u> Exhibit D, # <u>5</u> Exhibit E, # <u>6</u> Exhibit F, # <u>7</u> Exhibit G, # <u>8</u> Exhibit H, # <u>9</u> Exhibit I, # <u>10</u> Exhibit J, # <u>11</u> Exhibit K, # <u>12</u> Exhibit L)(Saad, Terry) (Entered: 05/20/2021)
05/21/2021	<u>36</u>	<i>Defendant Google LLC's</i> ANSWER to <u>1</u> Complaint, with Jury Demand by Google LLC. (Attachments: # <u>1</u> Exhibit A)(Mann, J.) (Entered: 05/21/2021)
05/21/2021	<u>37</u>	RULE 7 DISCLOSURE STATEMENT filed by Google LLC. (Mann, J.) (Entered: 05/21/2021)
05/25/2021	<u>38</u>	REPLY to Response to Motion, filed by Google LLC, re <u>16</u> MOTION to Stay <i>Pending Decision on Google LLC's Motion to Transfer</i> filed by Defendant Google LLC (Attachments: # <u>1</u> Declaration of Mark Liang, # <u>2</u> Exhibit 10)(Mann, J.) (Entered: 05/25/2021)
05/27/2021	<u>39</u>	Unopposed MOTION to Withdraw as Attorney <i>for Jerry D. Tice II</i> by Super Interconnect Techonologies LLC. (Attachments: # <u>1</u> Proposed Order)(Saad, Terry) (Entered: 05/27/2021)
06/01/2021	<u>40</u>	Sealed Document: Defendant's Reply in Support of <u>14</u> Sealed Motion Motion to Transfer Venue to the Northern District of California Under 28 U.S.C. § 1404(a) by Google LLC by Google LLC (Mann, J.) (Entered: 06/01/2021)
06/02/2021		Text Order GRANTING <u>39</u> Motion to Withdraw as Attorney. entered by Judge Alan D Albright. Before the Court is Plaintiffs Unopposed Motion for Withdrawal of Counsel for Jerry D. Tice II, as counsel for Plaintiff in the above-captioned lawsuit. Upon consideration, the Court GRANTS THE MOTION.IT IS THEREFORE ORDERED that the Unopposed Motion for Withdrawal is GRANTED, Jerry D. Tice II is withdrawn as counsel of record for Plaintiff in this lawsuit, and the Clerk shall amend the docket to reflect that Jerry D. Tice II has withdrawn as counsel and Mr. Tice no longer needs be noticed of any pleadings, motions, or other documents filed or served in this civil action. IT

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		IS SO ORDERED. (This is a text-only entry generated by the court. There is no document associated with this entry.) (ep4) (Entered: 06/02/2021)
06/07/2021	<u>41</u>	Redacted Copy <i>Google LLC's Reply in Support of Its Motion to Transfer Venue to the Northern District of California Under 28 U.S.C. § 1404(a)</i> of <u>40</u> Sealed Document by Google LLC. (Mann, J.) (Entered: 06/07/2021)
06/16/2021	<u>42</u>	Standing Order regarding Scheduling Order. Signed by Judge Alan D Albright. (Entered: 06/17/2021)
06/24/2021	<u>43</u>	STATUS REPORT <i>for Case Readiness</i> by Super Interconnect Technologies LLC. (Saad, Terry) (Entered: 06/24/2021)
07/02/2021	<u>44</u>	NOTICE <i>Google LLC's Notice of Supplemental Authority in Support of Its Motion to Transfer</i> by Google LLC re <u>14</u> Sealed Motion Motion to Transfer Venue to the Northern District of California Under 28 U.S.C. § 1404(a) by Google LLC (Attachments: # <u>1</u> Ex. A) (Silverman, Daniel) (Entered: 07/02/2021)
09/15/2021	<u>45</u>	Sealed Order DENYING DEFENDANTS MOTION TO TRANSFER. Signed by Judge Alan D Albright. (ir) (Entered: 09/15/2021)
10/08/2021	<u>46</u>	Standing Order Regarding Order Governing Proceedings Patent Cases. Signed by Judge Alan D Albright. (Entered: 10/13/2021)

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PACER Login:	om002190:2610089:0	Client Code:	13264/0600000-00010
Description:	Docket Report	Search Criteria:	6:21-cv-00259-ADA
Billable Pages:	7	Cost:	0.70

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

**SUPER INTERCONNECT
TECHNOLOGIES LLC,**

Plaintiff,

v.

GOOGLE LLC,

Defendant.

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JURY TRIAL DEMANDED

CIVIL ACTION NO. 6:21-cv-259

ORIGINAL COMPLAINT

Plaintiff Super Interconnect Technologies LLC (“Super Interconnect”) files this Original Complaint against Google LLC (“Google”) for infringement of U.S. Patent No. 7,627,044 (“the ’044 patent”), U.S. Patent No. 6,463,092 (“the ’092 patent”), and U.S. Patent No. 7,158,593 (“the ’593 patent”).

THE PARTIES

1. Super Interconnect Technologies LLC is a Texas limited liability company, located at 1701 Directors Blvd., Suite 300, Austin, Texas 78744.

2. On information and belief, Google LLC is a wholly-owned subsidiary of Alphabet, Inc. On information and belief, Google LLC is a limited liability company formed under the laws of the State of Delaware that has its principal place of business located at located at 1600 Amphitheatre Parkway, Mountain View, CA 94043. Google may be served with process through its registered agent, The Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808. Google does business in the State of Texas and in this District.

JURISDICTION AND VENUE

3. This action arises under the patent laws of the United States, namely 35 U.S.C.

§§ 271, 281, and 284-285, among others.

4. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

5. Venue is proper in this judicial district under 28 U.S.C. § 1400(b) because Google has committed acts of infringement in the District and has a regular and established place of business in this District, including its regular and established place of business at 500 W. 2nd St., Austin, TX 78701.

6. Google is subject to personal jurisdiction pursuant to due process due at least to its substantial business in this State, including: (A) at least part of its infringing activities alleged herein; and (B) regularly doing or soliciting business, engaging in other persistent conduct, and/or deriving substantial revenue from goods sold and services provided to Texas residents. Google has conducted and regularly conducts business within the United States and this District. Google has purposefully availed itself of the privileges of conducting business in the United States, and more specifically in Texas and this District. Google has sought protection and benefit from the laws of the State of Texas by placing infringing products into the stream of commerce through an established distribution channel with the awareness and/or intent that they will be purchased by consumers in this District.

7. On information and belief, Google has significant ties to, and presence in, this District, making venue in this judicial district both proper and convenient for this action.

COUNT I

(INFRINGEMENT OF U.S. PATENT NO. 7,627,044)

8. Super Interconnect incorporates paragraphs 1 through 14 herein by reference.

9. Super Interconnect is the assignee of the '044 patent, entitled "Clock-Edge Modulated Serial Link with DC-Balance Control," with ownership of all substantial rights in the '044 patent, including the right to exclude others and to enforce, sue, and recover damages for past

and future infringement. A true and correct copy of the '044 patent is attached as Exhibit A.

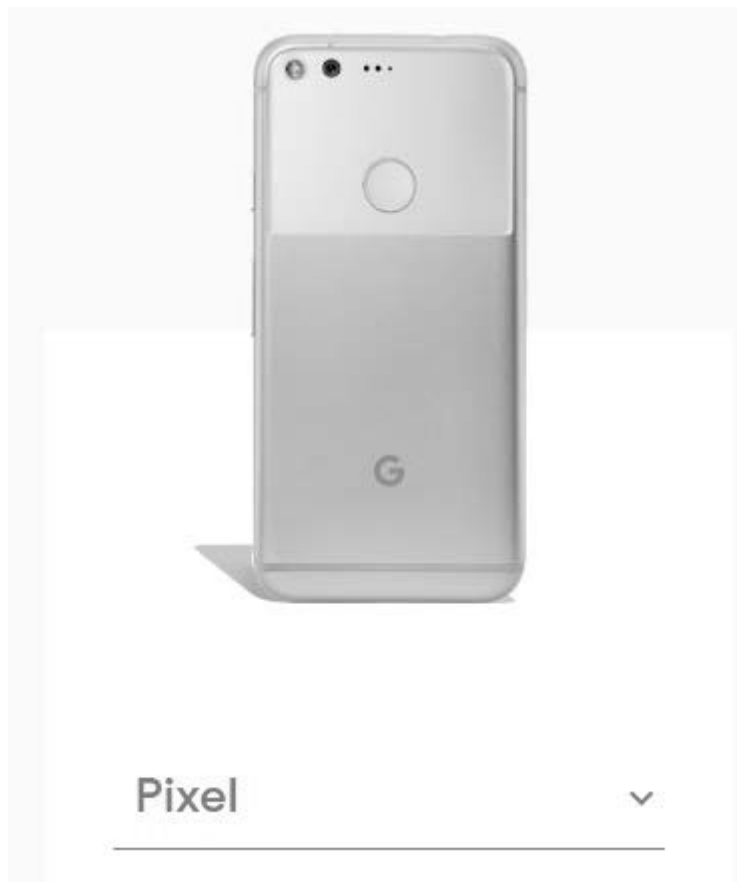
10. The '044 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '044 patent issued from U.S. Patent Application No. 11/264,303.

11. To the extent any marking or notice was required by 35 U.S.C. § 287, Super Interconnect and all predecessors-in-interest to the '044 patent have complied with the requirements of that statute by providing actual or constructive notice to Google of its alleged infringement.

12. Google has and continues to directly and/or indirectly infringe (by inducing infringement and/or contributing to infringement) one or more claims of the '044 patent in this judicial district and elsewhere in the United States, including at least claims 1, 2, 8, 9, 10, 11, 12, 13, 14, 15 and 19, by, among other things, making, having made, using, offering for sale, selling, and/or importing electronic devices with Universal Flash Storage (UFS) that incorporate the fundamental technologies covered by the '044 patent. These products are referred to as the "'044 Accused Products." Examples of the '044 Accused Products include, but are not limited to, the Google Pixel and Google Pixel XL series of smartphones.

13. For example, the Google Pixel directly infringes claim 1 of the '044 patent, as shown in the below paragraphs.

14. An example of the Google Pixel is shown in the image below.



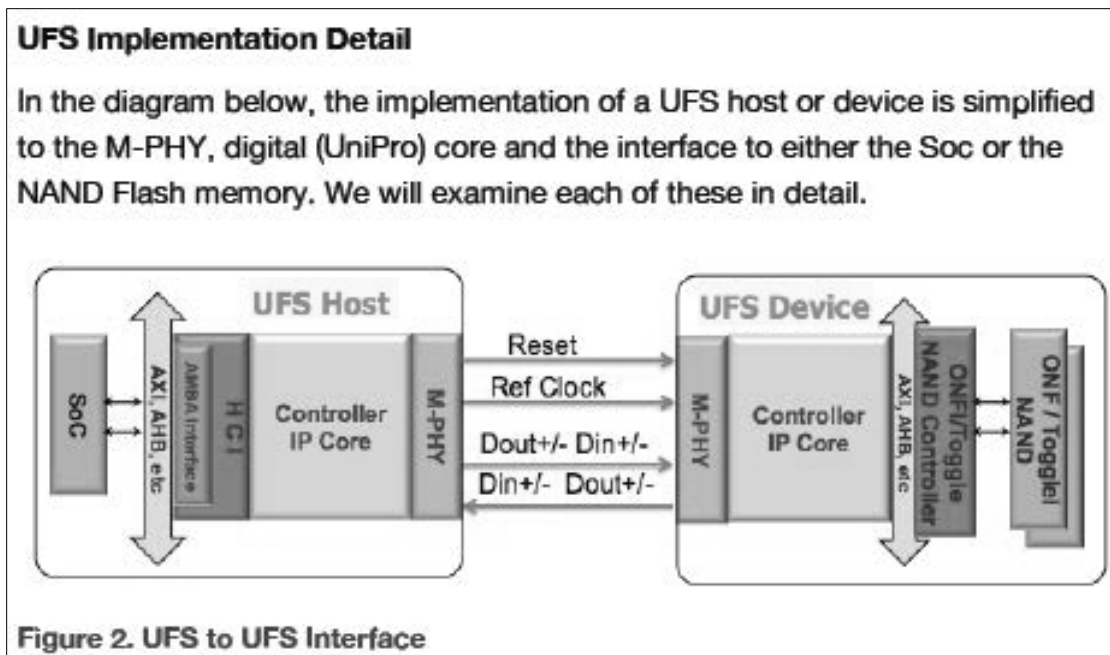
https://store.google.com/us/product/pixel_compare

15. Google incorporates UFS storage in its Pixel family of products, as shown in the image below.

What makes the Pixel phones interesting, to me, is the relative lack of technical compromise. They have a fast processor. A fast camera (with improved and quicker HDR+). Fast storage (UFS 2.0). A fast fingerprint scanner. Fast software (they really are blazing-quick). Fast charging. Fast updates (seamless updates). A fast GPU (for VR). There is little about these phones you can point to and say Google cheaped out on. And isn't that what so many of us have been demanding for years? A Google phone that could be positioned against the iPhone as legitimate competition (even if the iPhone does have its advantages - and disadvantages).

<http://www.androidpolice.com/2016/10/04/google-pixel-and-pixel-xl-hands-on-google-takes-on-the-iphone-by-becoming-the-iphone/>

16. The images below show that the Google Pixel's UFS storage uses the MIPI M-PHY protocol for physical layer communication between the UFS host and the UFS device.



Arasan Chip Systems Inc. White Paper, “Universal Flash Storage: Mobilize Your Data” at 6 (Oct. 2012).

M-PHY I/O

MIPI defines two types of M-PHY, type 1 and type 2. The UFS specification calls out type 1. M-PHY Type 1 uses NRZ signaling for HS and PWM signaling for LS, while type 2 uses NRZ signaling for both HS and LS.

UFS utilizes two speed modes, high-speed and low-speed. Low speed mode In Gear 1 is used upon power up or reset, then a transition occurs to high-speed gears for data transmission. The low speed gears and high-speed gears are listed here for your reference. UFS v1.1 has been ratified and supports HS Gear 2 running approximately @ 3Gbps per lane. The UFS spec also supports up to 4 lanes for higher throughput.

Id.

17. UFS hosts and devices, which are included in the '044 Accused Products, contain signal transmitters. These signal transmitters drive DC-balanced differential signals for a communications channel. Those signals include a pair of data signals: a positive data signal and a negative data signal (*see, e.g.,* Dout +/- and Din +/- in the *Arasan* figure above). These transmitters include circuitry that multiplex clock, data, and control signals to apply them to the communications channel node, allowing the UFS hosts and devices to communicate between each

other.

18. The '044 Accused Products thus include each and every limitation of claim 1 of the '044 patent; accordingly, they literally infringe this claim. Google directly infringes the '044 patent by making, using, offering to sell, selling, and/or importing the '044 Accused Products. Google is thereby liable for direct infringement.

19. During discovery and development of its infringement contentions, Plaintiff may provide additional theories under which Google infringes the '044 patent besides the example provided above, including for the same product and using the same components identified above, and nothing in the example above is meant to limit the infringement allegations of Plaintiff or limit the interpretations of the claims or their terms.

20. At a minimum, Google has known that the '044 Accused Products infringe the '044 patent at least as early as the service date of the complaint in *Super Interconnect Techs. LLC v. Google LLC*, No. 2:18-cv-00463 (E.D. Tex.). During that litigation, Plaintiff repeatedly and explicitly set forth Google's infringement of the '044 patent via its Pixel phones' incorporation of UFS devices, including in a detailed expert report on infringement. Despite that clear evidence of infringement, Google has refused to take a license to the '044 patent and continues to willfully infringe the '044 patent. Additionally, Google continued to release new products (e.g., the Pixel 5 and 4a) that incorporate UFS devices. Google did so despite its knowledge that such devices would infringe the '044 patent and without taking a license the '044 patent. Google has made a business decision to flout the patent rights of Plaintiff despite its knowing infringement of the '044 patent, presumably relying on the significant advantage in resources that Google holds over Plaintiff.

21. Thus, despite having knowledge of the '044 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '044 patent, Google has nevertheless

continued its infringing conduct and disregarded an objectively high likelihood of infringement. Google's infringing activities relative to the '044 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

22. Upon information and belief, since at least the above-mentioned date when Google was on notice of its infringement, Google has actively induced, under U.S.C. § 271(b), third-party manufacturers, distributors, importers and/or consumers that purchase or sell the '044 Accused Products that include all of the limitations of one or more claims of the '044 patent to directly infringe one or more claims of the '044 patent by making, having made, using, offering for sale, selling, and/or importing the '044 Accused Products. Since at least the notice provided on the above-mentioned date, Google does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '044 patent. Upon information and belief, Google intends to cause, and has taken affirmative steps to induce, infringement by these third-party manufacturers, distributors, importers, and/or consumers by, inter alia, creating advertisements that promote the infringing use of the '044 Accused Products, creating established distribution channels for the '044 Accused Products into and within the United States, manufacturing the '044 Accused Products in conformity with U.S. laws and regulations, distributing or making available instructions or manuals for these products to purchasers and prospective buyers, and/or providing technical support, replacement parts, or services for these products to these purchasers in the United States. For example, Google provides technical support for the Pixel on its own website at the following web address: <https://support.google.com/pixelphone#topic=7078250>.

23. Super Interconnect has been damaged as a result of Google’s infringing conduct described in this Count. Google is, thus, liable to Super Interconnect in an amount that adequately compensates Super Interconnect for Google’s infringement, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT II
(INFRINGEMENT OF U.S. PATENT NO. 6,463,092)

24. Super Interconnect incorporates paragraphs 1 through 23 herein by reference.

25. Super Interconnect is the assignee of the ’092 patent, entitled “System and Method for Sending and Receiving Data Signals Over A Clock Signal Line,” with ownership of all substantial rights in the ’092 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringement. A true and correct copy of the ’092 patent is attached as Exhibit B.

26. The ’092 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The ’092 patent issued from U.S. Patent Application No. 09/393,235.

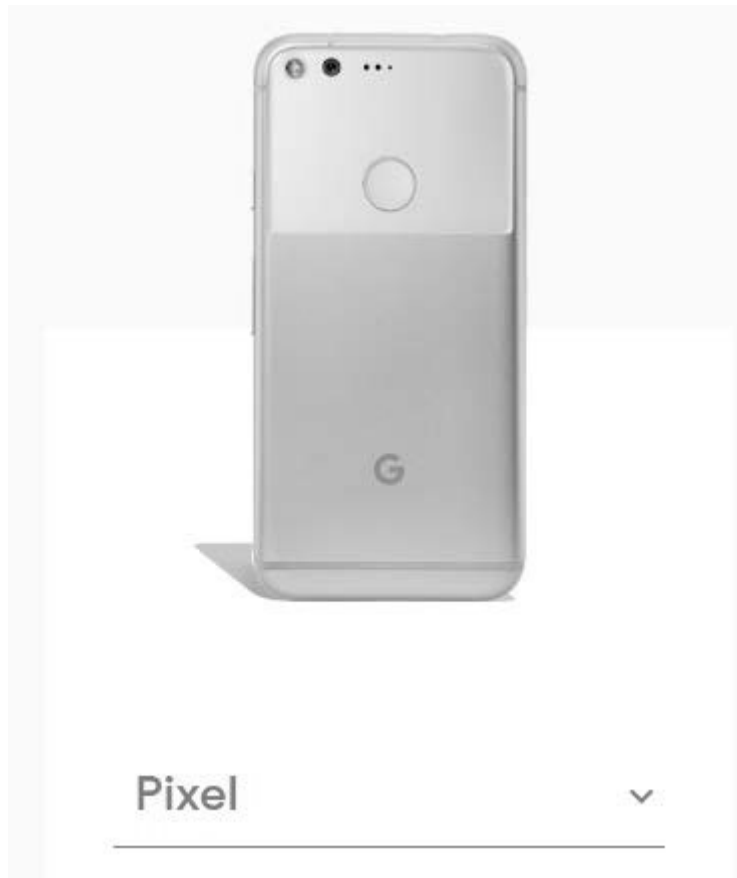
27. To the extent any marking or notice was required by 35 U.S.C. § 287, Super Interconnect and all predecessors-in-interest to the ’092 patent have complied with the requirements of that statute by providing actual or constructive notice to Google of its alleged infringement.

28. Google has and continues to directly and/or indirectly infringe (by inducing infringement and/or contributing to infringement) one or more claims of the ’092 patent in this judicial district and elsewhere in the United States, including at least claims 1, 2, 5, 10, and 11 by, among other things, making, having made, using, offering for sale, selling, and/or importing electronic devices with Universal Flash Storage (UFS) that incorporate the fundamental

technologies covered by the '092 patent. These products are referred to as the "'092 Accused Products." Examples of the '092 Accused Products include, but are not limited to, the Google Pixel and Google Pixel XL series of smartphones.

29. For example, the Google Pixel directly infringes claim 1 of the '029 patent, as shown in the below paragraphs.

30. An example of the Google Pixel is shown in the image below.



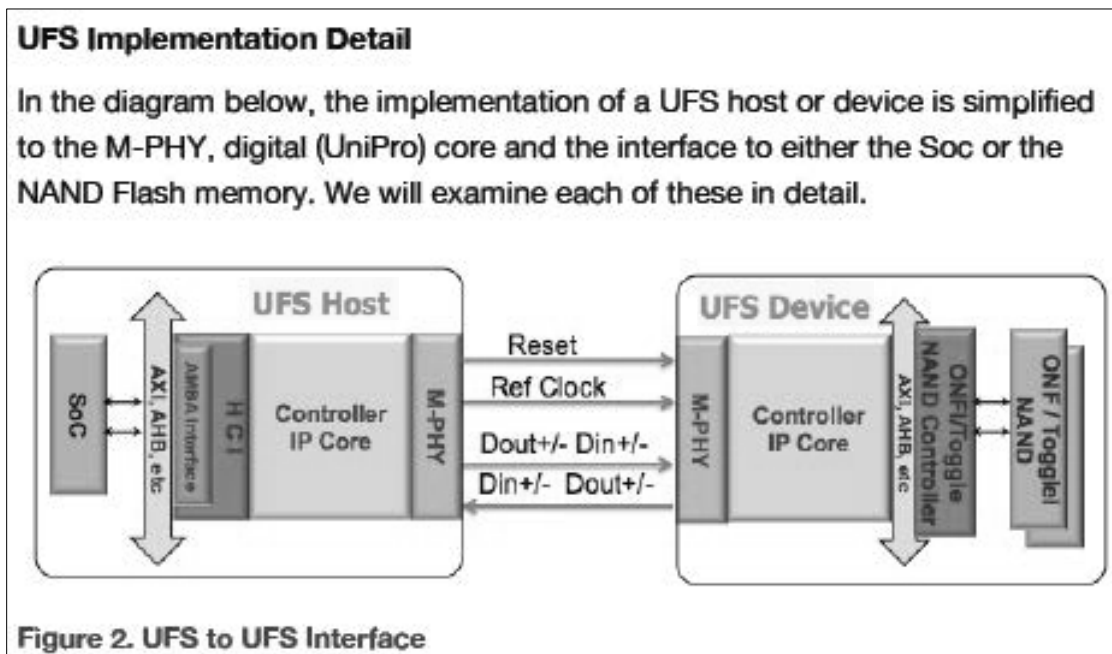
https://store.google.com/us/product/pixel_compare

31. Google incorporates UFS storage in its Pixel family of products, as shown in the image below.

What makes the Pixel phones interesting, to me, is the relative lack of technical compromise. They have a fast processor. A fast camera (with improved and quicker HDR+). Fast storage (UFS 2.0). A fast fingerprint scanner. Fast software (they really are blazing-quick). Fast charging. Fast updates (seamless updates). A fast GPU (for VR). There is little about these phones you can point to and say Google cheaped out on. And isn't that what so many of us have been demanding for years? A Google phone that could be positioned against the iPhone as legitimate competition (even if the iPhone does have its advantages - and disadvantages).

<http://www.androidpolice.com/2016/10/04/google-pixel-and-pixel-xl-hands-on-google-takes-on-the-iphone-by-becoming-the-iphone/>

32. The images below show that the Google Pixel's UFS storage uses the MIPI M-PHY protocol for physical layer communication between the UFS host and the UFS device.



Arasan Chip Systems Inc. White Paper, “Universal Flash Storage: Mobilize Your Data” at 6 (Oct. 2012).

M-PHY I/O

MIPI defines two types of M-PHY, type 1 and type 2. The UFS specification calls out type 1. M-PHY Type 1 uses NRZ signaling for HS and PWM signaling for LS, while type 2 uses NRZ signaling for both HS and LS.

UFS utilizes two speed modes, high-speed and low-speed. Low speed mode In Gear 1 is used upon power up or reset, then a transition occurs to high-speed gears for data transmission. The low speed gears and high-speed gears are listed here for your reference. UFS v1.1 has been ratified and supports HS Gear 2 running approximately @ 3Gbps per lane. The UFS spec also supports up to 4 lanes for higher throughput.

Id.

33. UFS hosts and devices, which are included in the '092 Accused Products, transmit a clock and data signal over a signal line, for example, according to the MIPI M-PHY protocol. To do so, the '092 Accused Products include a clock generator, with multiple inputs, modulating the falling edge of an output signal to indicate different data values, thus providing for data transmission between the UFS hosts and devices. And at least one of the inputs that the clock generator receives is a control signal indicating a data value to be transmitted.

34. The '092 Accused Products thus include each and every limitation of claim 1 of the '092 patent; accordingly, they literally infringe this claim. Google directly infringes the '092 patent by making, using, offering to sell, selling, and/or importing the '092 Accused Products. Google is thereby liable for direct infringement.

35. During discovery and development of its infringement contentions, Plaintiff may provide additional theories under which Google infringes the '092 patent besides the example provided above, including for the same product and using the same components identified above, and nothing in the example above is meant to limit the infringement allegations of Plaintiff or limit the interpretations of the claims or their terms.

36. At a minimum, Google has known that the '092 Accused Products infringe the '092 patent at least as early as the service date of the complaint in *Super Interconnect Techs. LLC v. Google LLC*, No. 2:18-cv-00463 (E.D. Tex.). During that litigation, Plaintiff repeatedly and explicitly set forth Google's infringement of the '092 patent via its Pixel phones' incorporation of UFS devices, including in a detailed expert report on infringement. Despite that clear evidence of infringement, Google has refused to take a license to the '092 patent and continues to willfully infringe the '092 patent. Additionally, Google continued to release new products (e.g., the Pixel 5 and 4a) that incorporate UFS devices. Google did so despite its knowledge that such devices would infringe the '092 patent and without taking a license the '092 patent. Google has made a business decision to flout the patent rights of Plaintiff despite its knowing infringement of the '092 patent, presumably relying on the significant advantage in resources that Google holds over Plaintiff.

37. Thus, despite having knowledge of the '092 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '092 patent, Google has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Google's infringing activities relative to the '092 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

38. Upon information and belief, since at least the above-mentioned date when Google was on notice of its infringement, Google has actively induced, under U.S.C. § 271(b), third-party manufacturers, distributors, importers and/or consumers that purchase or sell the '092 Accused Products that include all of the limitations of one or more claims of the '092 patent to directly

infringe one or more claims of the '092 patent by making, having made, using, offering for sale, selling, and/or importing the '092 Accused Products. Since at least the notice provided on the above-mentioned date, Google does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '092 patent. Upon information and belief, Google intends to cause, and has taken affirmative steps to induce, infringement by these third-party manufacturers, distributors, importers, and/or consumers by, inter alia, creating advertisements that promote the infringing use of the '092 Accused Products, creating established distribution channels for the '092 Accused Products into and within the United States, manufacturing the '092 Accused Products in conformity with U.S. laws and regulations, distributing or making available instructions or manuals for these products to purchasers and prospective buyers, and/or providing technical support, replacement parts, or services for these products to these purchasers in the United States. For example, Google provides technical support for the Pixel on its own website at the following web address: <https://support.google.com/pixelphone#topic=7078250>.

39. Super Interconnect has been damaged as a result of Google's infringing conduct described in this Count. Google is, thus, liable to Super Interconnect in an amount that adequately compensates Super Interconnect for Google's infringement, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT III **(INFRINGEMENT OF U.S. PATENT NO. 7,158,593)**

40. Super Interconnect incorporates paragraphs 1 through 39 herein by reference.

41. Super Interconnect is the assignee of the '593 patent, entitled "Combining a Clock Signal and a Data Signal," with ownership of all substantial rights in the '593 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringement. A true and correct copy of the '593 patent is attached as Exhibit C.

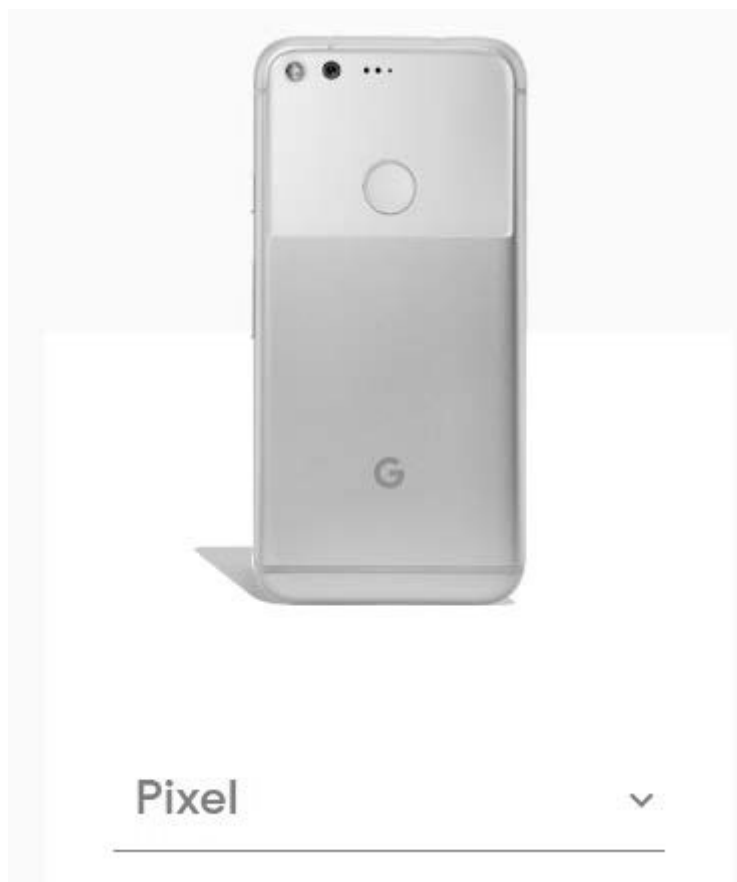
42. The '593 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '593 patent issued from U.S. Patent Application No. 10/099,533.

43. To the extent any marking or notice was required by 35 U.S.C. § 287, Super Interconnect and all predecessors-in-interest to the '593 patent have complied with the requirements of that statute by providing actual or constructive notice to Google of its alleged infringement.

44. Google has and continues to directly and/or indirectly infringe (by inducing infringement and/or contributing to infringement) one or more claims of the '593 patent in this judicial district and elsewhere in the United States, including at least claims 34 and 35, by, among other things, making, having made, using, offering for sale, selling, and/or importing electronic devices with Universal Flash Storage (UFS) that incorporate the fundamental technologies covered by the '593 patent. These products are referred to as the "'593 Accused Products." Examples of the '593 Accused Products include, but are not limited to, the Google Pixel and Pixel XL series of smartphones.

45. The Google Pixel directly infringes claim 34 of the '593 patent, as shown in the below paragraphs.

46. An example of the Google Pixel is shown in the image below.



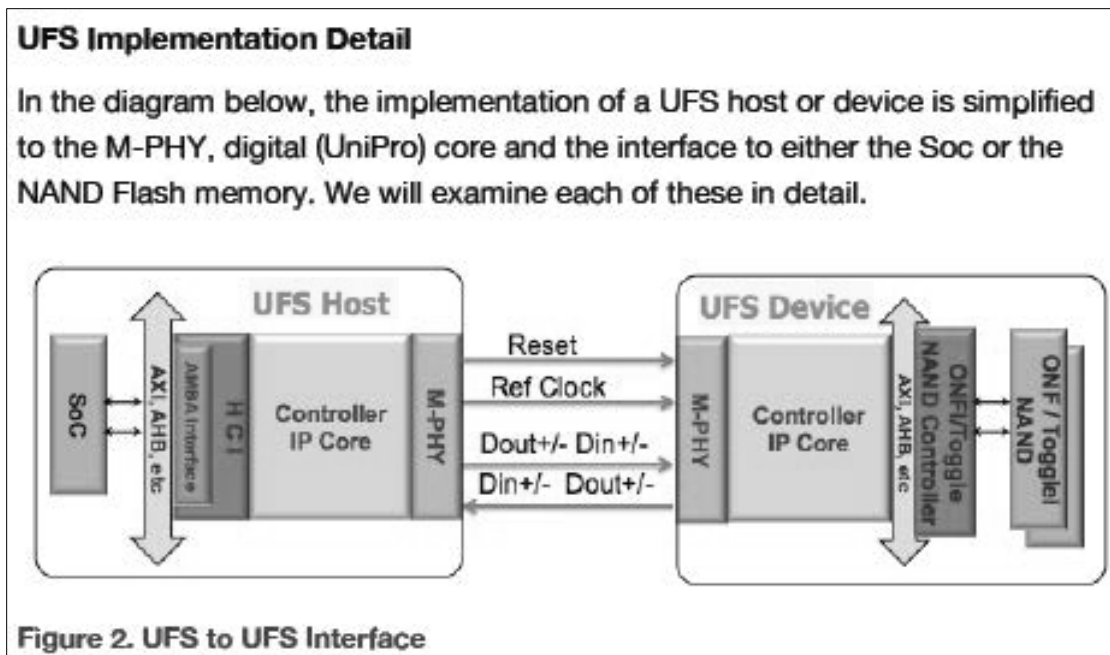
https://store.google.com/us/product/pixel_compare

47. Google incorporates UFS storage in its Pixel family of products, as shown in the image below.

What makes the Pixel phones interesting, to me, is the relative lack of technical compromise. They have a fast processor. A fast camera (with improved and quicker HDR+). Fast storage (UFS 2.0). A fast fingerprint scanner. Fast software (they really are blazing-quick). Fast charging. Fast updates (seamless updates). A fast GPU (for VR). There is little about these phones you can point to and say Google cheaped out on. And isn't that what so many of us have been demanding for years? A Google phone that could be positioned against the iPhone as legitimate competition (even if the iPhone does have its advantages - and disadvantages).

<http://www.androidpolice.com/2016/10/04/google-pixel-and-pixel-xl-hands-on-google-takes-on-the-iphone-by-becoming-the-iphone/>

48. The images below show that the Google Pixel's UFS storage uses the MIPI M-PHY protocol for physical layer communication between the UFS host and the UFS device.



Arasan Chip Systems Inc. White Paper, “Universal Flash Storage: Mobilize Your Data” at 6 (Oct. 2012).

M-PHY I/O

MIPI defines two types of M-PHY, type 1 and type 2. The UFS specification calls out type 1. M-PHY Type 1 uses NRZ signaling for HS and PWM signaling for LS, while type 2 uses NRZ signaling for both HS and LS.

UFS utilizes two speed modes, high-speed and low-speed. Low speed mode In Gear 1 is used upon power up or reset, then a transition occurs to high-speed gears for data transmission. The low speed gears and high-speed gears are listed here for your reference. UFS v1.1 has been ratified and supports HS Gear 2 running approximately @ 3Gbps per lane. The UFS spec also supports up to 4 lanes for higher throughput.

Id.

49. UFS hosts and devices, which are included in the '593 Accused Products, contain signal transmitters, as shown for example in the *Arasan* figure above. These transmitters generate a combined a clock and encoded data signal. The transmitters encode data and pulse width modulate the encoded data into the combined signal. This encoding scheme shifts an energy spectrum of the combined clock and encoded data signal away from an effective loop bandwidth of a clock recovery block.

50. The '593 Accused Products thus include each and every limitation of claim 34 of the '593 patent; accordingly, they literally infringe this claim. Google directly infringes the '593 patent by making, using, offering to sell, selling, and/or importing the '593 Accused Products. Google is thereby liable for direct infringement.

51. During discovery and development of its infringement contentions, Plaintiff may provide additional theories under which Google infringes the '593 patent besides the example provided above, including for the same product and using the same components identified above, and nothing in the example above is meant to limit the infringement allegations of Plaintiff or limit the interpretations of the claims or their terms.

52. At a minimum, Google has known that the '593 Accused Products infringe the '593 patent at least as early as the service date of the complaint in *Super Interconnect Techs. LLC v. Google LLC*, No. 2:18-cv-00463 (E.D. Tex.). During that litigation, Plaintiff repeatedly and explicitly set forth Google's infringement of the '593 patent via its Pixel phones' incorporation of UFS devices, including in a detailed expert report on infringement. Despite that clear evidence of infringement, Google has refused to take a license to the '593 patent and continues to willfully infringe the '593 patent. Additionally, Google continued to release new products (e.g., the Pixel 5 and 4a) that incorporate UFS devices. Google did so despite its knowledge that such devices would infringe the '593 patent and without taking a license the '593 patent. Google has made a business decision to flout the patent rights of Plaintiff despite its knowing infringement of the '593 patent, presumably relying on the significant advantage in resources that Google holds over Plaintiff.

53. Thus, despite having knowledge of the '593 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '593 patent, Google has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement.

Google's infringing activities relative to the '593 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

54. Upon information and belief, since at least the above-mentioned date when Google was on notice of its infringement, Google has actively induced, under U.S.C. § 271(b), third-party manufacturers, distributors, importers and/or consumers that purchase or sell the '593 Accused Products that include all of the limitations of one or more claims of the '593 patent to directly infringe one or more claims of the '593 patent by making, having made, using, offering for sale, selling, and/or importing the '593 Accused Products. Since at least the notice provided on the above-mentioned date, Google does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '593 patent. Upon information and belief, Google intends to cause, and has taken affirmative steps to induce, infringement by these third-party manufacturers, distributors, importers, and/or consumers by, *inter alia*, creating advertisements that promote the infringing use of the '593 Accused Products, creating established distribution channels for the '593 Accused Products into and within the United States, manufacturing the '593 Accused Products in conformity with U.S. laws and regulations, distributing or making available instructions or manuals for these products to purchasers and prospective buyers, and/or providing technical support, replacement parts, or services for these products to these purchasers in the United States. For example, Google provides technical support for the Pixel on its own website at the following web address: <https://support.google.com/pixelphone#topic=9153446>.

55. Super Interconnect has been damaged as a result of Google's infringing conduct

described in this Count. Google is, thus, liable to Super Interconnect in an amount that adequately compensates Super Interconnect for Google's infringement, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

JURY DEMAND

Super Interconnect hereby requests a trial by jury pursuant to Rule 38 of the Federal Rules of Civil Procedure.

PRAYER FOR RELIEF

Super Interconnect requests that the Court find in its favor and against Google, and that the Court grant Super Interconnect the following relief:

- a. Judgment that one or more claims of the '044, '092, and '593 patents have been infringed, either literally and/or under the doctrine of equivalents, by Google and/or by others whose infringement has been induced by Google;
- b. Judgment that Google account for and pay to Super Interconnect all damages to and costs incurred by Super Interconnect because of Google's infringing activities and other conduct complained of herein;
- c. Judgment that Google account for and pay to Super Interconnect a reasonable, ongoing, post-judgment royalty because of Google's infringing activities and other conduct complained of herein;
- d. Judgment that Google's conduct warrants that the Court award increased damages up to treble damages pursuant to 35 U.S.C. § 284;
- e. Judgment that Super Interconnect be granted pre-judgment and post-judgment interest on the damages caused by Google's infringing activities and other conduct complained of herein;
- f. Judgment and an order finding this to be an exceptional case and requiring Google to pay the costs of this action (including all disbursements) and attorneys' fees as provided by 35 U.S.C. § 285; and
- g. That Super Interconnect be granted such other and further relief as the Court may deem just and proper under the circumstances.

DATED: March 15, 2021

Respectfully submitted,

/s/ Jeffrey R. Bragalone.

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Jerry Tice

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Attorneys for Plaintiff

SUPER INTERCONNECT

TECHNOLOGIES LLC

EXHIBIT A

(12) **United States Patent**
Kim et al.

(10) **Patent No.:** **US 7,627,044 B2**
(45) **Date of Patent:** **Dec. 1, 2009**

(54) **CLOCK-EDGE MODULATED SERIAL LINK WITH DC-BALANCE CONTROL**

(75) Inventors: **Gyudong Kim**, Sunnyvale, CA (US);
Won Jun Choe, Seoul (KR);
Deog-Kyoon Jeong, Seoul (KR); **Jaeha Kim**, Mountain View, CA (US);
Bong-Joon Lee, Seoul (KR); **Min-Kyu Kim**, Sunnyvale, CA (US)

(73) Assignee: **Silicon Image, Inc.**, Sunnyvale, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 605 days.

(21) Appl. No.: **11/264,303**

(22) Filed: **Oct. 31, 2005**

(65) **Prior Publication Data**

US 2007/0098112 A1 May 3, 2007

(51) **Int. Cl.**
H04B 3/00 (2006.01)

(52) **U.S. Cl.** **375/257**

(58) **Field of Classification Search** 375/257,
375/259, 260, 295, 316, 319; 324/98; 455/453,
455/284, 305; 718/105; 370/284, 301
See application file for complete search history.

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* cited by examiner

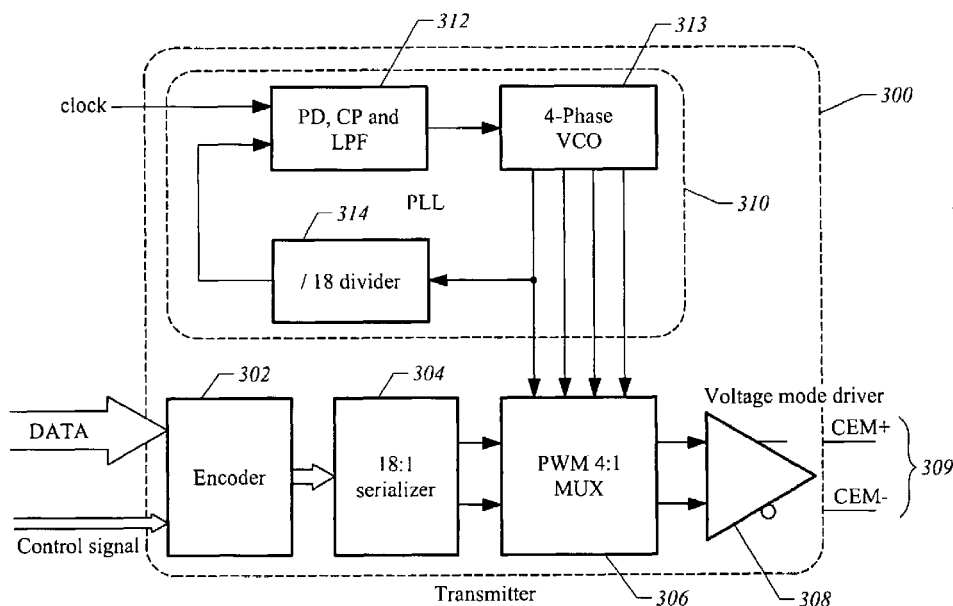
Primary Examiner—Sam K Ahn

(74) Attorney, Agent, or Firm—Blakely Sokoloff Taylor & Zafman

(57) **ABSTRACT**

A battery powered computing device has a channel configured as a single direct current balanced differential channel. A signal transmitter is connected to the channel. The signal transmitter is configured to apply clock edge modulated signals to the channel, where the clock edge modulated signals include direct current balancing control signals. A signal receiver is connected to the channel. The signal receiver is configured to recover the direct current balancing control signals.

19 Claims, 8 Drawing Sheets



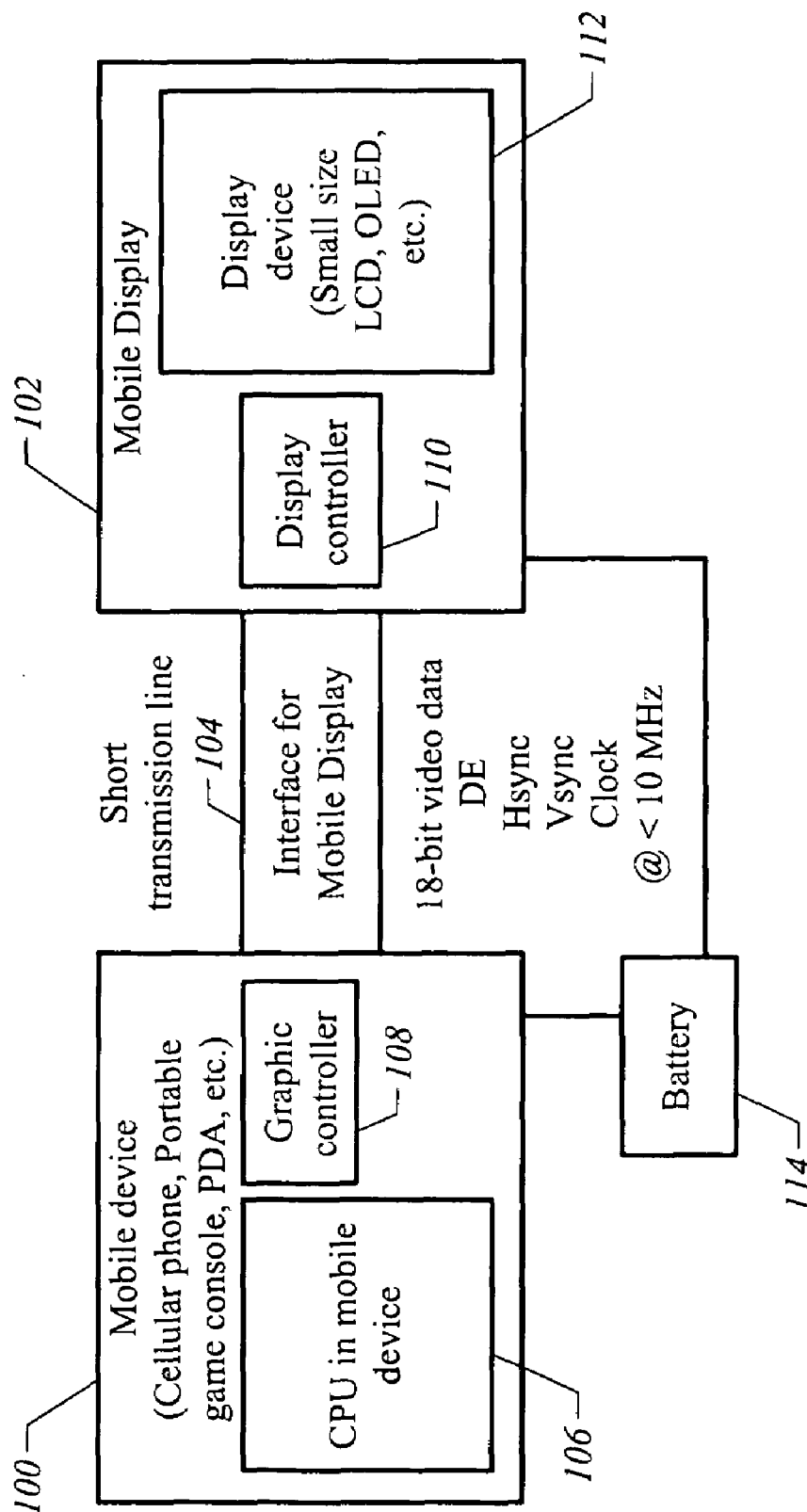


FIG. 1

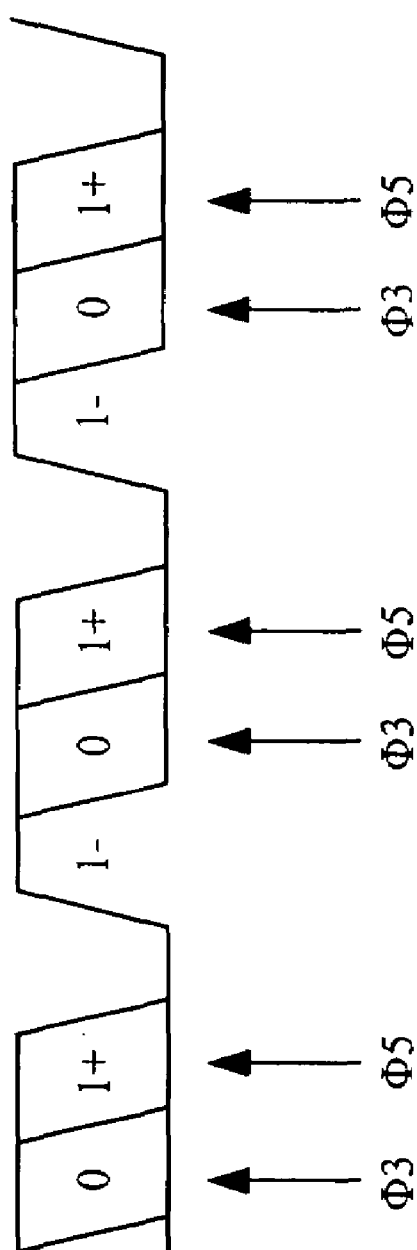


FIG. 2A

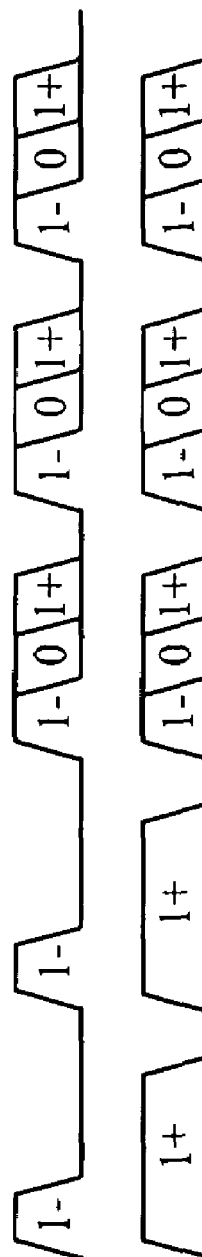


FIG. 2B

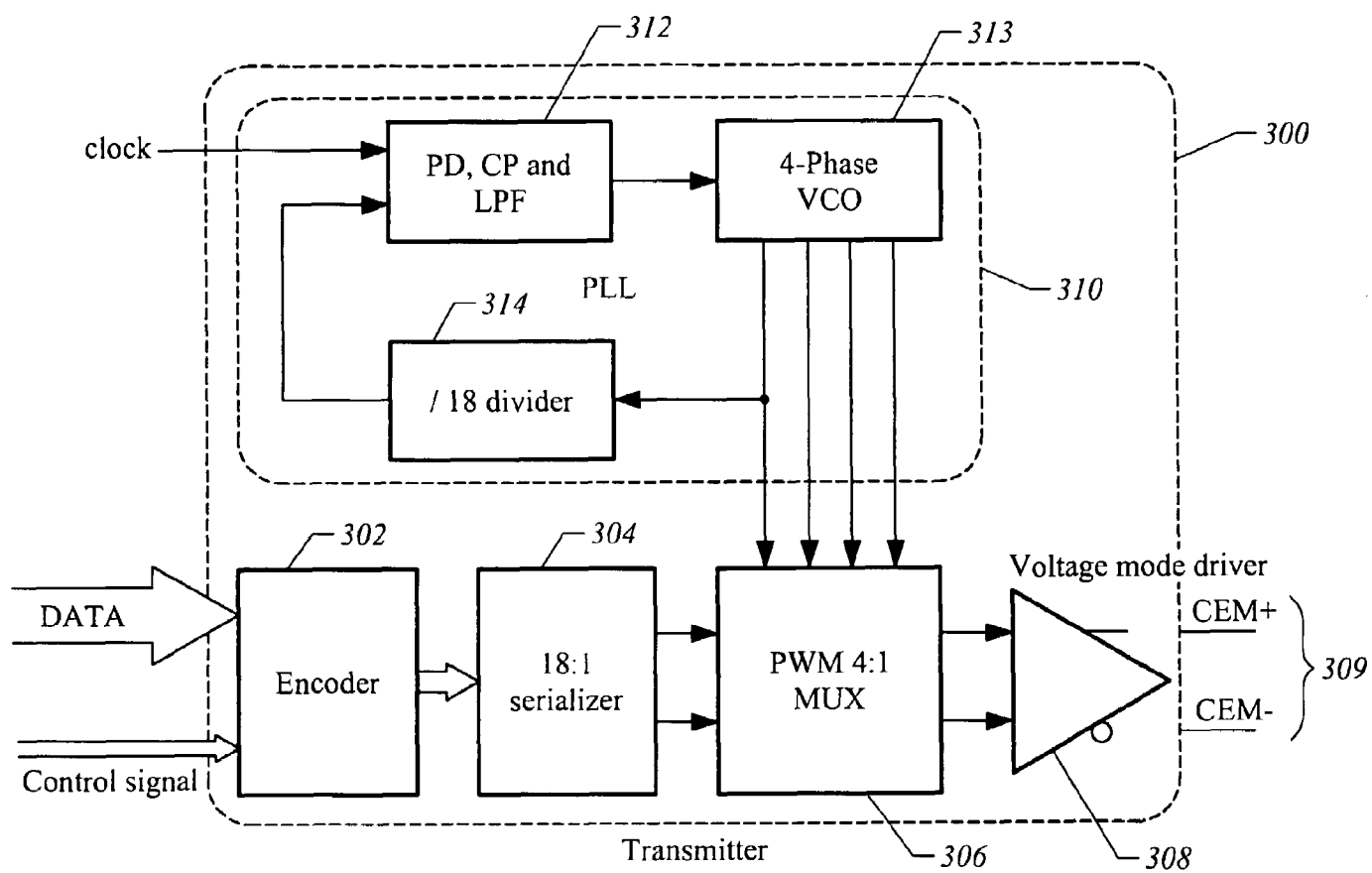


FIG. 3

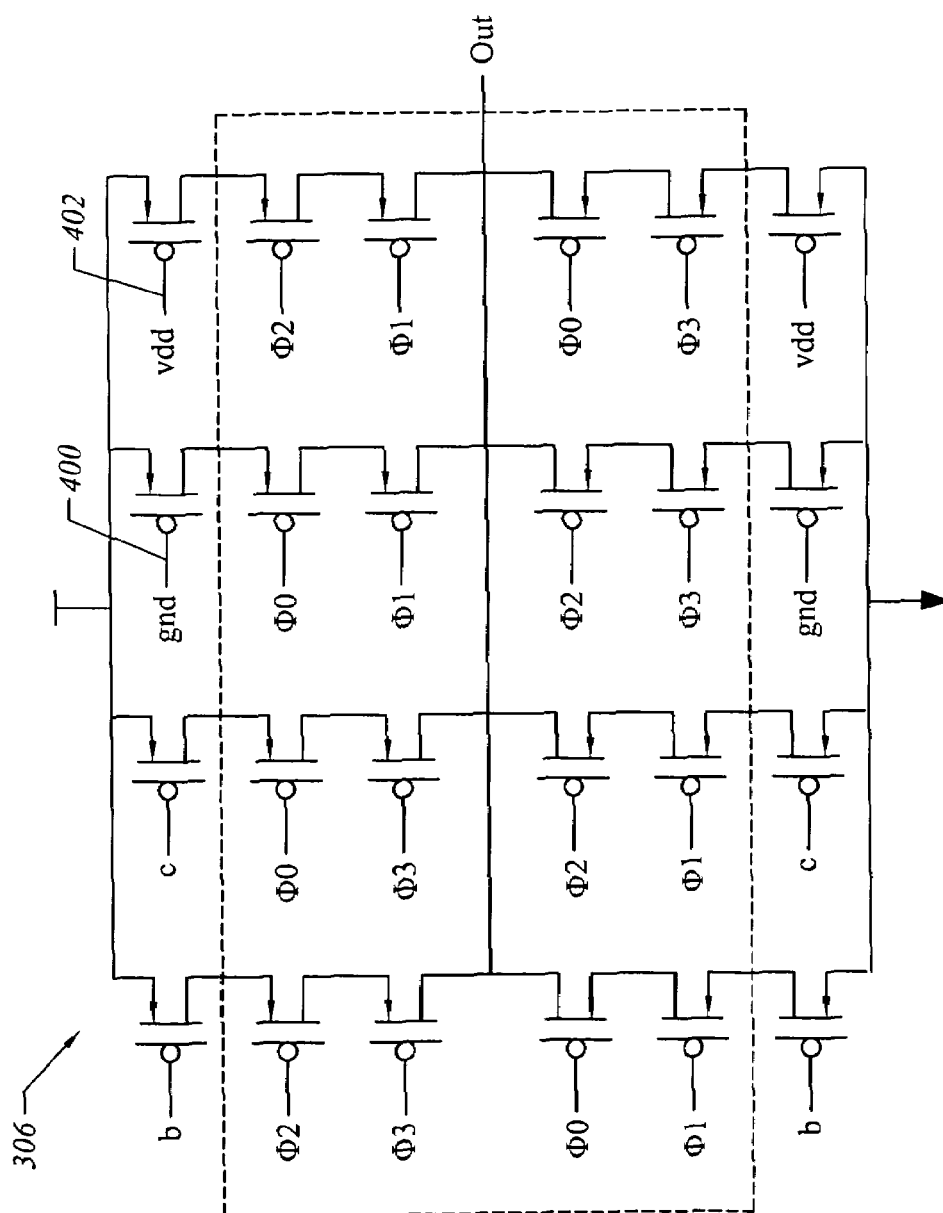


FIG. 4

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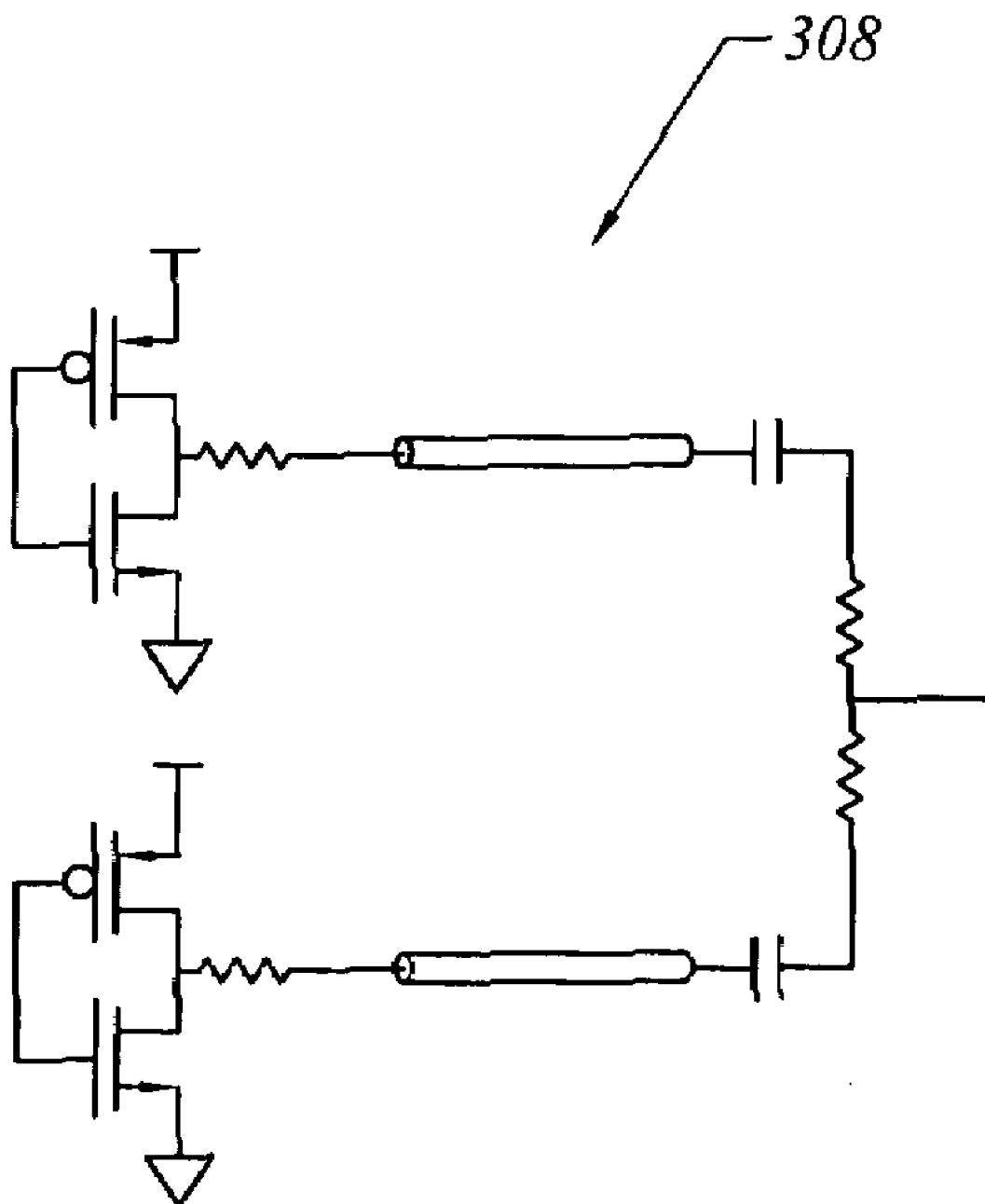


FIG. 5

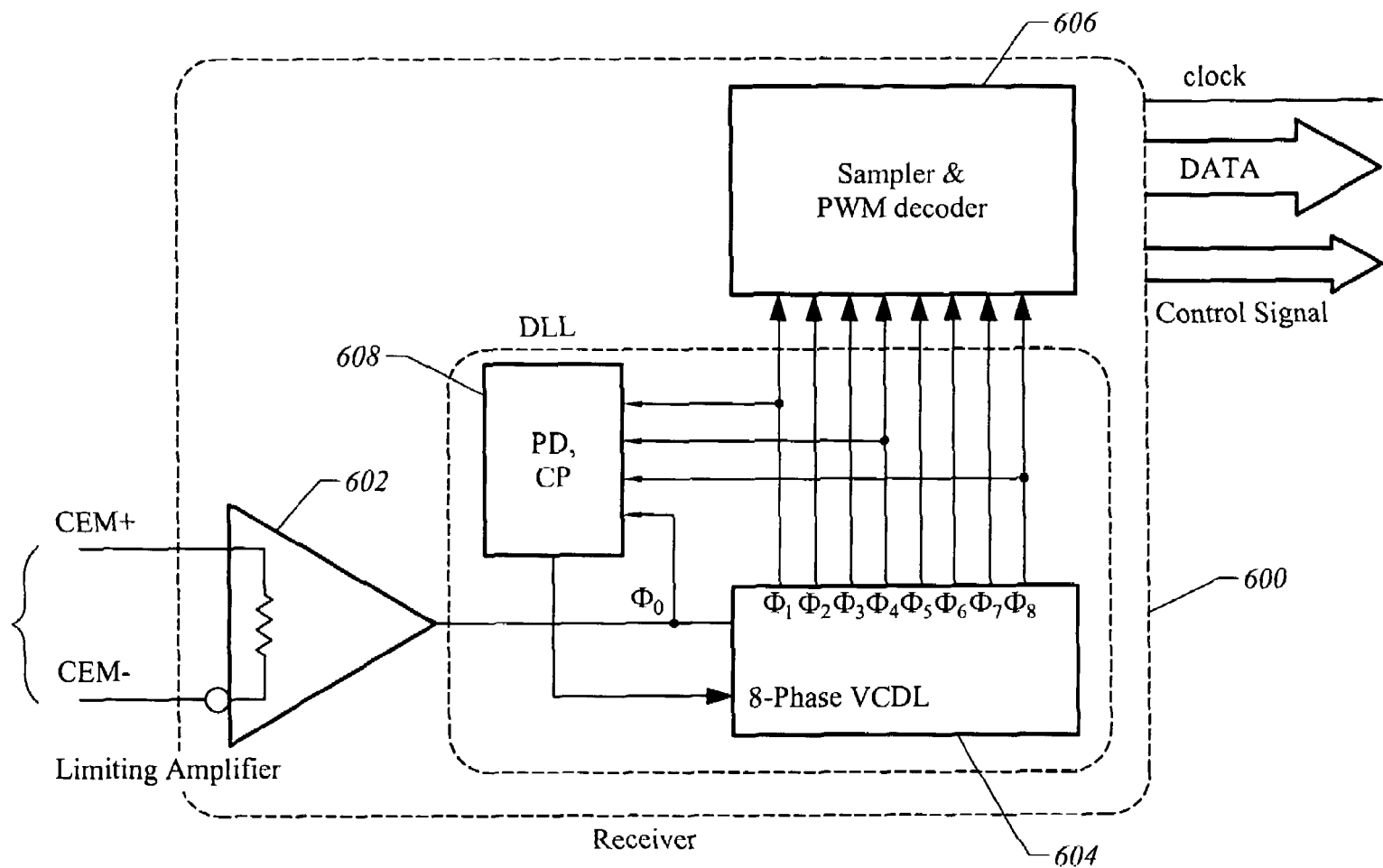


FIG. 6

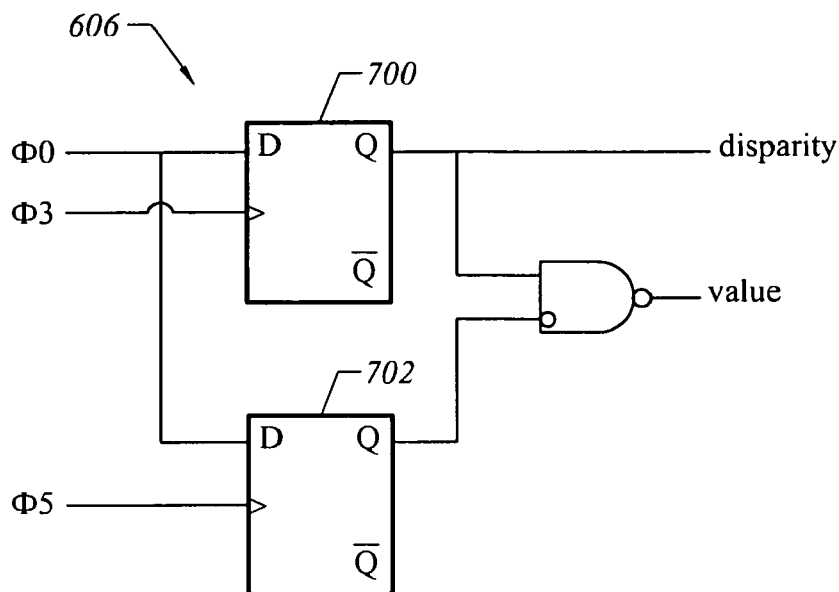


FIG. 7

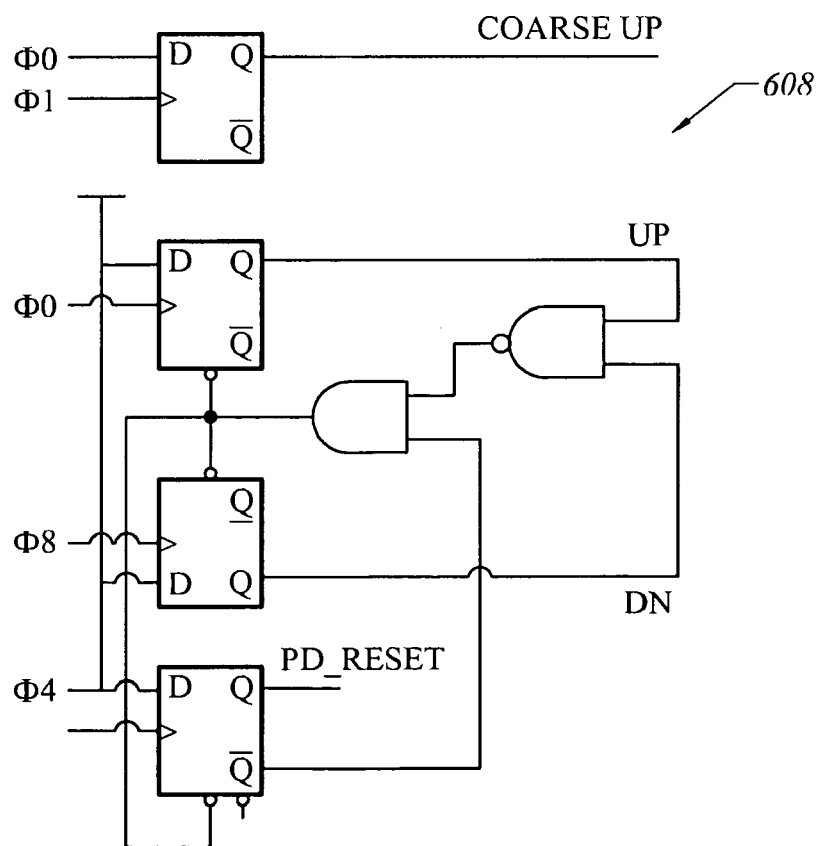


FIG. 8A

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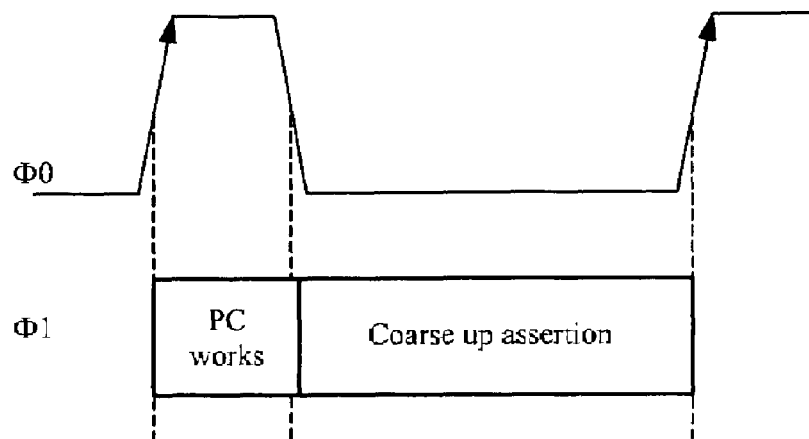


FIG. 8B

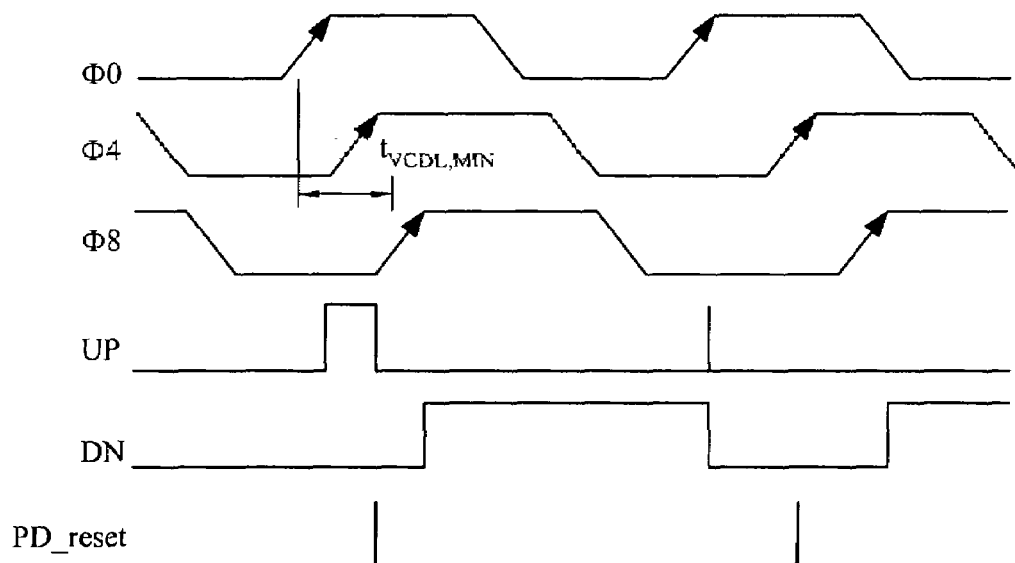


FIG. 8C

US 7,627,044 B2

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**CLOCK-EDGE MODULATED SERIAL LINK
WITH DC-BALANCE CONTROL****BRIEF DESCRIPTION OF THE INVENTION**

This invention relates generally to the transmission of serial signals, such as in a transition minimized differential signaling system. More particularly, this invention relates to a clock-edge modulated serial link incorporating direct current (DC) balancing control signals.

BACKGROUND OF THE INVENTION

Mobile devices, such as cellular phones, Personal Digital Assistants (PDAs) and portable game consoles continue to grow in popularity. FIG. 1 illustrates an example of such a mobile device. In particular, FIG. 1 illustrates a mobile device 100 connected to a mobile display 102 via an interface 104. The mobile device 100 includes a central processing unit 106 and a graphic controller 108. The mobile display 102 includes a display controller 110 and a display 112, such as a liquid crystal display. A battery 114 powers the mobile device 100 and the mobile display 102. Low power design is critical in mobile applications of this type.

A conventional mobile device interface 104 uses parallel channels with single-ended full-swing signaling. The channels are composed of many lines, for example, 22 lines with 18-bit video pixel data lines and control signal lines, such as dot-clock, data enable (DE), horizontal sync (HSYNC), vertical sync (VSYNC), and other display-specific configuration settings. These signal lines consume power and space. In addition, they produce excessive electromagnetic radiation. To reduce the number of lines, a serial link with low-voltage swing differential signaling may be used. As known in the art, this type of signaling amplifies difference signals, while rejecting common-mode signals.

Popular display interfaces, such as Low Voltage Differential Signaling (LVDS) and Digital Visual Interface (DVI) use 3 channels of serialized differential signals for 18-bit or 24-bit pixel color data. In addition, a separate channel is used for clock transmission. In such an application, the voltage swing is reduced to about 400 mV.

In certain applications, such as a mobile display, relatively low video resolution is acceptable. In such a case, it is possible to use a single data channel. However, in this situation, the prior art has relied upon a separate clock channel. Since the dedicated channel solely for clock transmission increases hardware costs and power, it would be desirable to remove the dedicated clock channel and use only a single channel for transmitting the clock, data and control signals. However, if conventional network protocols, such as 802.3z Gigabit Ethernet are employed, a number of problems arise. For example, a local reference clock must be used at the receiver. This increases hardware costs and reduces flexibility in transmission bandwidth.

In view of the foregoing, it would be desirable to provide a low-power mobile device with a serial channel that supports clock, data and control signals, such as DC balancing control signals.

SUMMARY OF THE INVENTION

The invention includes a battery powered computing device with a channel configured as a single direct current balanced differential channel. A signal transmitter is connected to the channel. The signal transmitter is configured to apply clock edge modulated signals to the channel, where the

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clock edge modulated signals include direct current balancing control signals. A signal receiver is connected to the channel. The signal receiver is configured to recover the direct current balancing control signals.

The invention includes a signal transmitter. The signal transmitter has a channel node to interface with a single direct current balanced differential channel. Circuitry is connected to the channel node, the circuitry being configured to multiplex clock, data and control signals and apply them to the channel node. The clock signal is pulse width modulated to incorporate direct current balancing control signals.

The invention also includes a signal receiver. A channel node interfaces with a channel configured as a single direct current balanced differential channel. Circuitry is connected to the channel node. The circuitry is configured to de-multiplex clock, data and control signals from the channel node. The circuitry identifies direct current balancing control signals within a pulse width modulate clock signal.

The invention allows many parallel channels to be reduced to a single serial channel, which reduces power consumption. To further reduce power dissipation, the invention may be implemented with voltage-mode drivers. Still additional power reduction can be achieved by removing the source transmission channel termination and relying solely upon receiver side source transmission channel termination. The invention includes a delay-locked loop (DLL) data-recovery circuit that operates robustly in a high jitter environment.

BRIEF DESCRIPTION OF THE FIGURES

The invention is more fully appreciated in connection with the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 illustrates a mobile device and a mobile display that may be configured in accordance with an embodiment of the invention.

FIG. 2A illustrates DC-balanced clock-edge modulation in accordance with an embodiment of the invention.

FIG. 2B illustrates special character embedded clock-edge modulation utilized in accordance with an embodiment of the invention.

FIG. 3 illustrates a clock-edge modulated transmitter configured in accordance with an embodiment of the invention.

FIG. 4 illustrates a multiplexer that may be used in the clock-edge modulated transmitter of FIG. 3.

FIG. 5 illustrates a voltage mode driver utilized in accordance with an embodiment of the invention.

FIG. 6 illustrates a clock-edge modulated receiver configured in accordance with an embodiment of the invention.

FIG. 7 illustrates clock-edge modulated decoder that may be used in accordance with an embodiment of the invention.

FIG. 8A illustrates a phase detector circuit configured in accordance with an embodiment of the invention.

FIG. 8B illustrates the use of a coarse-up signal in accordance with an embodiment of the invention.

FIG. 8C illustrates various signals processed in accordance with an embodiment of the invention.

Like reference numerals refer to corresponding parts throughout the several views of the drawings.

DETAILED DESCRIPTION OF THE INVENTION

The invention includes a single-channel serial link using clock edge modulation (CEM). This scheme, also known as pulse-width modulation (PWM), encodes data information onto a periodic clock by varying the position of a selected edge (i.e., the rising edge or falling edge); thus, the pulse-

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width of the clock is altered or modulated. The invention provides techniques to transfer a clock signal, data and control signals over a single channel.

By way of example, the invention may be implemented by varying the falling edge of the clock signal. As shown in FIG. 2A, data are encoded as a variation of the clock falling edge position, while the position of the rising edge is fixed. The periodic occurrence of the rising edges enables easy extraction of the clock signal, from which the receiver can generate the “dot-clock” simply by dividing down the incoming signal (e.g., by 18) with no further clock recovery mechanism. The modulation of the falling edge position or the clock pulse width allows one to embed data and control signals in the clock, therefore reducing the pin count.

U.S. Pat. No. 6,463,092 (the ‘092 patent) utilizes a pulse width modulation technique of this type. The ‘092 patent, which is assigned to the assignee of the current invention, is hereby incorporated by reference. The current invention builds upon the disclosed scheme of the ‘092 patent to achieve DC-balancing. In one embodiment, DC-balancing is achieved by inserting DC-balancing control signals into the serial link. The DC-balancing control signals may include signals to maintain DC-balance, increase DC-balance, and decrease DC-balance. Standard techniques are used to generate and process the DC-balance control signals. An aspect of the invention is directed toward incorporating the DC-balance control signals into a single serial link along with clock and data signals.

In one embodiment of the invention, the bit “0” is coded as a 50% duty cycle clock, indicating that no changes are necessary to keep balance. On the other hand, the bit “1” is coded as either a 25% or a 75% duty cycle clock, denoted as “1-” and “1+”, respectively, in FIG. 2(a). Whether to use a 25% or a 75% duty cycle is determined by the DC value of the bits transmitted so far. If the DC value is lower than nominal, the bit “1” is coded as 75%, and vice versa. With this encoding, the maximum disparity counted in unit pulse length (i.e., 25% pulse width) is only 2 and good DC-balance is achieved.

The serial link may also be used to transmit control signals, such as HSYNC and VSYNC. In one embodiment, these control signals are transmitted when DE is unasserted. Leveraging this fact, the state of DE being 0 is coded as two consecutive “1-”s or “1+”s, as shown in FIG. 2(b), which is an impossible sequence while the normal pixel data are being sent (i.e., DE is 1). This special sequence indicates that the following 16 pulse-width modulated symbols represent control characters. In this way, the control signals can be transmitted without requiring any additional channels. That is, the invention leverages the DE 0 state (when data is not being sent) to send DC-balance and other control information on a single channel.

FIG. 3 illustrates a transmitter 300 configured in accordance with an embodiment of the invention. The transmitter 300 includes an encoder 302 that receives data and control signals. For example, the data may be 6 bits of red pixel data, 6 bits of green pixel data, and 6 bits of blue pixel data. The control signals may include HSYNC, VSYNC, and DE signals. The output of the encoder 302 is applied to a serializer circuit 304, which serializes the data and control information for the serial link. The encoder 302 or the serializer circuit 304 may be used to generate a DC-balance control signal.

The serialized data is then applied to a multiplexer, which receives control inputs from a phase-locked loop 310. The output of the multiplexer 306 is applied to a channel driver 308, in this case a voltage mode driver, which produces differential clock-edge modulated signals. In particular, the

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channel driver 308 applies a positive CEM signal (CEM+) and a negative CEM signal (CEM-) to a channel node 309.

In one embodiment, the phase detector 312 of the phase-locked loop 310 multiplies the reference clock by 18 and operates with a voltage controlled oscillator 313 to generate 4 clock phases: $0(\phi_0)$, $90(\phi_1)$, $180(\phi_2)$, and $270(\phi_3)$. A divider 314 divides the multiplied clock signal and provides a feedback input to the phase detector 312. The transmitter operates as if it is sending 4 Non-Return to Zero (NRZ) bits per symbol using these clock phases. The phase signals are processed by the multiplexer 306.

FIG. 4 illustrates a pulse width modulated 4-to-1 multiplexer configured in accordance with an embodiment of the invention. Note that the first bit 400 and the last bit 402 are fixed at 1 and 0, respectively. Only the middle two bits (b and c in FIG. 4) need to vary to express the three different falling edge positions. The encoder 302 and serializer 304 may be used to generate these two bits from the parallel pixel data and control signals.

Since power consumption is a significant concern in a mobile device, an embodiment of the invention uses a voltage mode driver 308 for off-chip signaling in the CEM transmitter. FIG. 5 illustrates a known voltage mode driver that may be used in accordance with an embodiment of the invention. Unlike other prior art drivers, the voltage mode driver does not have a current source stack, hence it is capable of low voltage operation. To reduce the power consumption, the voltage mode driver is designed to operate at 1.2V supply and the voltage swing is also reduced to 80 mV. Since the link span of the mobile display is short (less than several inches) and the CEM signal is relatively immune to inter-symbol interference, an 80 mV swing is enough to guarantee proper operation of the receiver. Using the voltage mode driver with reduced swing, the CEM transmitter has been implemented to consume less than 1 mW when operating at 270 Mbps.

For the proposed CEM link, the data is delivered on the clock signal, making the receiver architecture much simpler. That is, the receiver does not require an NRZ phase detector nor a local frequency reference, as is the case in many serial link receivers. In one embodiment, the invention uses a delay locked loop (DLL) for data recovery, as shown in FIG. 6.

The receiver 600 has a front-end limiting amplifier 602 which receives differential input signals CEM+ and CEM- at channel node 603. The amplifier 602 facilitates an adequate signal level for the DLL input. A voltage-controlled delay line (VCDL) 604 generates 8-phase delayed clocks to sample and decode the CEM data. FIG. 2(a) shows a timing relationship between sampling clocks and input CEM data. In one embodiment, the sampler 606 examines the CEM data at two different phases (ϕ_3 and ϕ_5 , as shown in FIG. 2A) to identify the location of the clock falling edge.

FIG. 7 illustrates a sampler and pulse-width modulated decoder 606 implemented with two flip-flops 700 and 702. Each flip-flop receives the ϕ_0 signal, while flip flop 700 receives the ϕ_3 signal and flip flop 702 receives the ϕ_5 signal. Using the sampled results, the CEM decoder extracts the data and disparity information. From the disparity information, the receiver can detect the pixel boundary and special sequences indicating DE, HSYNC, and VSYNC.

As shown in FIG. 6, the input CEM data is sampled by its own delayed version. So, the DLL can recover data even if the input clock has a large amount of jitter. To ensure enough lock range of the DLL, a phase detector 608 with false-lock detection may be used. FIG. 8A illustrates a phase detector 608 configured in accordance with an embodiment of the invention. If the initial delay of VCDL is larger than $2 \times T_{CLK}$, i.e., the rising edge of the ϕ_1 clock is located in the shaded area of

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FIG. 8(b), the coarse_up signal is asserted to prevent harmonic lock. On the other hand, when the initial delay is so small that the VCDL delay would be stuck to its minimum value, the PD_reset signal is asserted to deactivate the false up signal. This is accomplished by comparing rising edges of $\phi 0$ and $\phi 4$, as shown in FIG. 8(c). If the rising edge of $\phi 4$ is found between $\phi 0$ and $\phi 8$, the phase detector no longer generates an up signal, but makes the VCDL slow down.

The clock-edge modulated serial link of the invention has been fabricated in a standard 0.18 μm CMOS technology. The fabricated chip consumes 3.12 mW at 1.2 V supply voltage when operating at 270 Mb/s.

Those skilled in the art will appreciate that the invention may be implemented with various modifications. For example, the serial link may be augmented with multiple links to increase throughput. In addition, the invention can be utilized in a bidirectional (full-duplex) mode. Also, since differential mode signals are used, there is a common mode signal that may be used for other purposes. For example, the common mode signal may be used to exchange configuration data. The configuration data may specify such parameters as data format, data destination (when multiple transmitters/receivers are connected on the bus), data directionality, and the like.

The foregoing description, for purposes of explanation, used specific nomenclature to provide a thorough understanding of the invention. However, it will be apparent to one skilled in the art that specific details are not required in order to practice the invention. Thus, the foregoing descriptions of specific embodiments of the invention are presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed; obviously, many modifications and variations are possible in view of the above teachings. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, they thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the following claims and their equivalents define the scope of the invention.

The invention claimed is:

1. A signal transmitter, comprising:
a channel node to interface with a single direct current balanced differential channel; and
circuitry connected to the channel node, the circuitry being configured to multiplex clock, data and control signals and apply them to the channel node, wherein the clock signal is pulse width modulated to incorporate direct current balancing control signals.
2. The signal transmitter of claim 1 wherein the circuitry is configured to specify a low direct current value at a first duty cycle position.
3. The signal transmitter of claim 2 wherein the circuitry is configured to specify a high direct current value at a second duty cycle position.
4. The signal transmitter of claim 3 wherein the circuitry is configured to specify a no change direct current value at a third duty cycle position.
5. The signal transmitter of claim 1 wherein the circuitry generates multiple phase signals.

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6. The signal transmitter of claim 5 wherein the circuitry includes a multiplexer to process the multiple phase signals and serialized data.

7. The signal transmitter of claim 6 wherein the circuitry includes a voltage mode driver to process the output of the multiplexer.

8. A signal receiver, comprising:

a channel node to interface with a channel configured as a single direct current balanced differential channel; and
circuitry connected to the channel node, the circuitry configured to de-multiplex clock, data and control signals from the channel node, wherein the circuitry identifies direct current balancing control signals within a pulse width modulated clock signal.

9. The signal receiver of claim 8 wherein the circuitry includes an amplifier to process signals from the channel.

10. The signal receiver of claim 9 wherein the circuitry includes a delay-locked loop to process output from the amplifier.

11. The signal receiver of claim 10 wherein the delay-locked loop generates multiple phase signals for application to a pulse width modulated decoder.

12. The signal receiver of claim 11 wherein the delay-locked loop generates multiple phase signals for application to a phase detector.

13. A battery powered computing device, comprising:

a channel configured as a single direct current balanced differential channel;

a signal transmitter connected to the channel, the signal transmitter being configured to multiplex clock, data, and control signals, wherein the clock signal is pulse width modulated to incorporate direct current balancing control signals, the signal transmitter configured to apply the multiplexed signals to the channel; and

a signal receiver connected to the channel, the signal receiver configured to de-multiplex the clock, data and control signals from the channel node, the signal receiver configured to identify and recover the direct current balancing control signals from the pulse width modulated clock signal.

14. The battery powered computing device of claim 13 wherein the signal transmitter includes a voltage-mode driver.

15. The battery powered computing device of claim 13 wherein the channel is terminated only at the signal receiver.

16. The battery powered computing device of claim 13 further comprising a graphics controller connected to the signal transmitter.

17. The battery powered computing device of claim 13 further comprising a display controller connected to the signal receiver.

18. The battery powered computing device of claim 13 wherein the signal transmitter and the signal receiver are configured to exchange configuration information using a common mode signal on the channel.

19. The battery powered computing device of claim 13 wherein the signal transmitter and the signal receiver are configured for bidirectional data transfers over the channel.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,627,044 B2
APPLICATION NO. : 11/264303
DATED : December 1, 2009
INVENTOR(S) : Kim et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

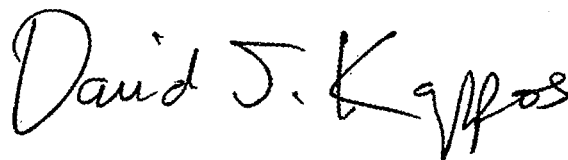
On the Title Page:

The first or sole Notice should read --

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1001 days.

Signed and Sealed this

Second Day of November, 2010

A handwritten signature in black ink, reading "David J. Kappos". The signature is written in a cursive, flowing style.

David J. Kappos
Director of the United States Patent and Trademark Office

EXHIBIT B

(12) **United States Patent**
Kim et al.

(10) **Patent No.: US 6,463,092 B1**
(45) **Date of Patent: Oct. 8, 2002**

(54) **SYSTEM AND METHOD FOR SENDING AND RECEIVING DATA SIGNALS OVER A CLOCK SIGNAL LINE**

FR 2 251 139 6/1975 H04L/5/14

OTHER PUBLICATIONS

(75) Inventors: **Gyudong Kim**, Sunnyvale, CA (US);
Min-Kyu Kim, Cupertino, CA (US);
Seung Ho Hwang, Palo Alto, CA (US)

“Phase Modulation I/O Interface Circuit”; Kazutaka Nogami et al.; IEEE International Solid-State Circuit Conference; vol. 37 Feb. 1994 (New York, US); 3 pages.

(73) Assignee: **Silicon Image, Inc.**, Sunnyvale, CA (US)

Loinaz, Marc J., Wooley, Bruce A., “A BiCMOS Time Interval Digitizer for High-Energy Physics Instrumentation”, Center for Integrated Systems, Stanford University, IEEE 1993 Custom Integrated Circuits Conference, pp. 28.6.1–28.6.4.

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

Primary Examiner—Chi Pham

Assistant Examiner—Khanh Cong Tran

(21) Appl. No.: **09/393,235**

(74) *Attorney, Agent, or Firm*—Perkins Coie LLP; Paul Hickman; Steve S. Kelley

(22) Filed: **Sep. 9, 1999**

Related U.S. Application Data

(60) Provisional application No. 60/099,770, filed on Sep. 10, 1998.

(51) **Int. Cl.**⁷ **H04B 1/38**

(52) **U.S. Cl.** **375/219; 375/220; 375/244; 375/257; 375/293; 375/354; 375/355; 375/360; 370/284; 370/301**

(58) **Field of Search** **375/219, 220, 375/244, 257, 288, 293, 354, 355, 359, 360, 377; 370/284, 301, 307**

(56) References Cited

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4,459,591 A 7/1984 Haubner et al. 340/825.57
5,577,071 A 11/1996 Gehrke et al. 375/259

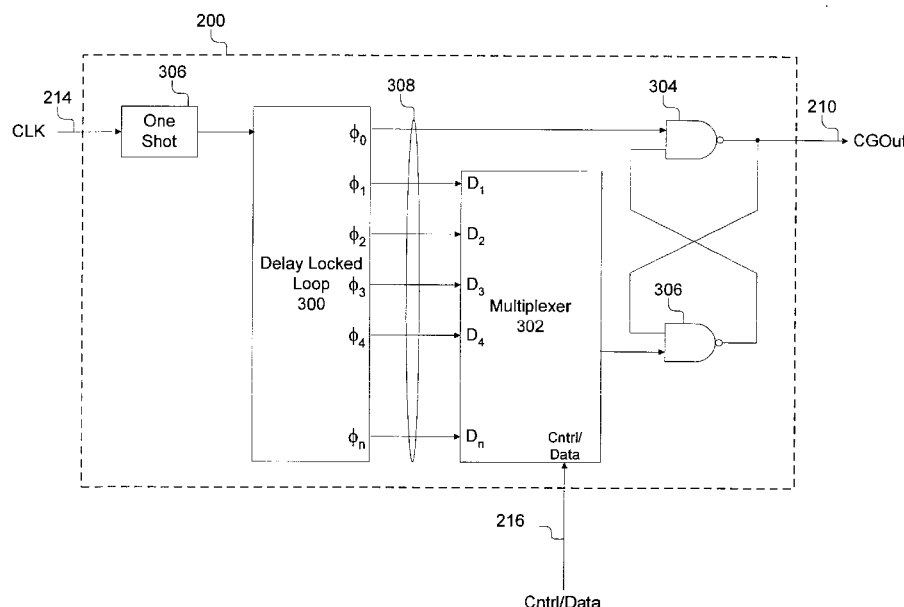
FOREIGN PATENT DOCUMENTS

EP 0 798 901 A1 10/1997 H04L/25/49

(57) ABSTRACT

The system preferably includes a unique transmitter that sends both clock and data signals over the same transmission line. The receiver uses the same transmission line to send data signals back to the transmitter. The transmitter comprises a clock generator, a decoder and a line interface. The clock generator produces a clock signal that includes a variable position falling edge. The falling edge position is decoded by the receiver to extract data from the clock signal. The receiver comprises a clock re-generator, a data decoder and a return channel encoder. The clock re-generator monitors the transmission line, receives signals, filters them and generates a clock signal at the receiver from the signal on the transmission line. The return channel encoder generates signals and asserts them on the transmission line. The signal is asserted or superimposed over the clock & data signal provided by the transmitter.

26 Claims, 17 Drawing Sheets



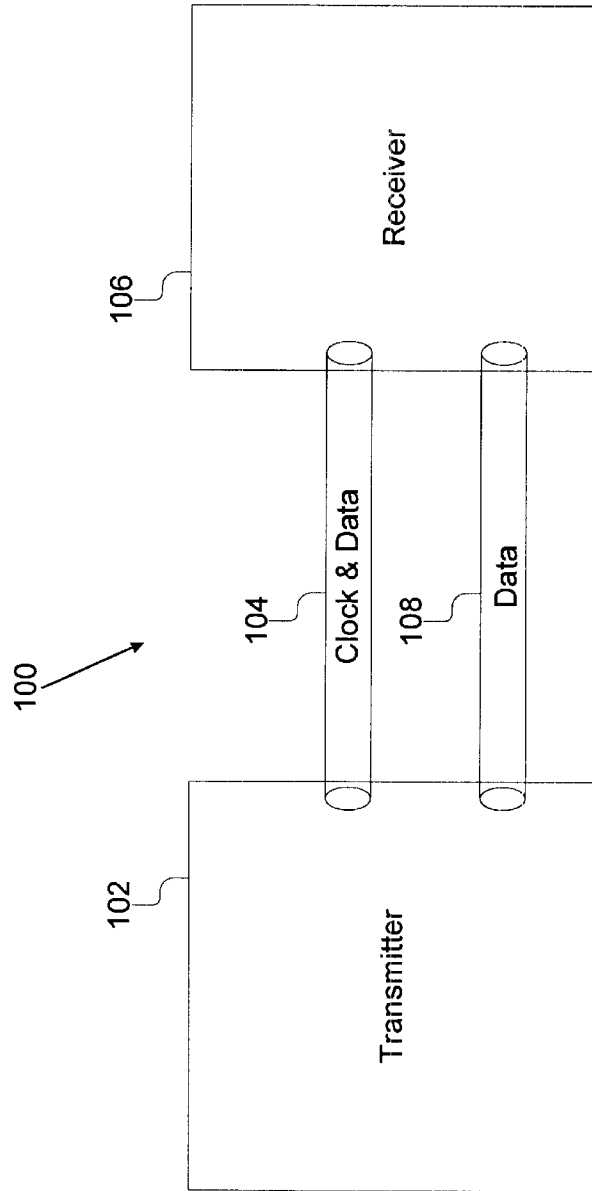


Figure 1

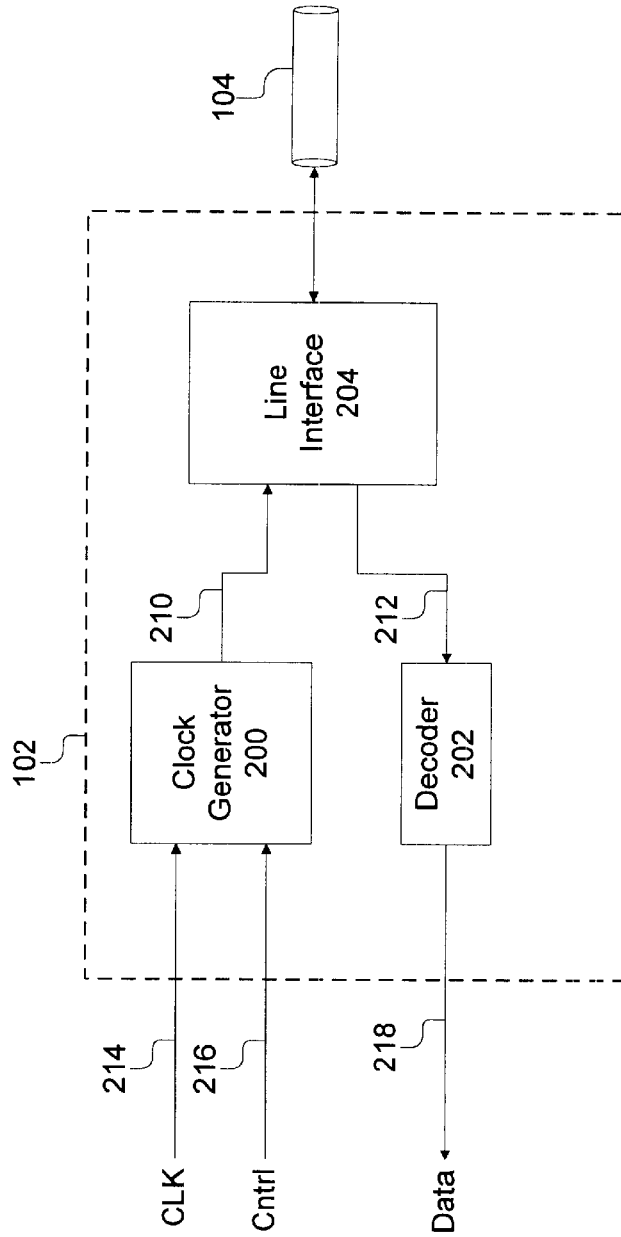


Figure 2

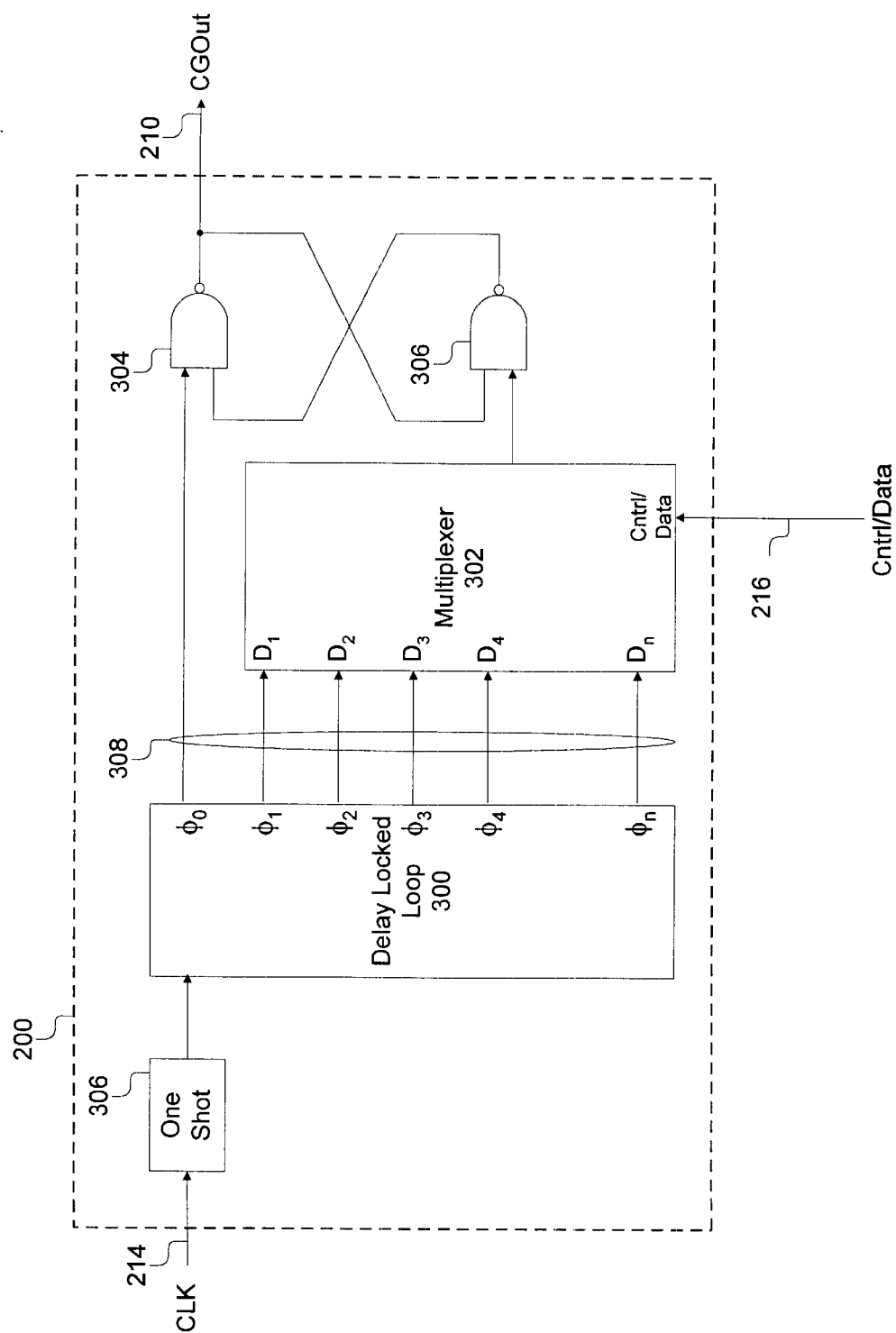


Figure 3

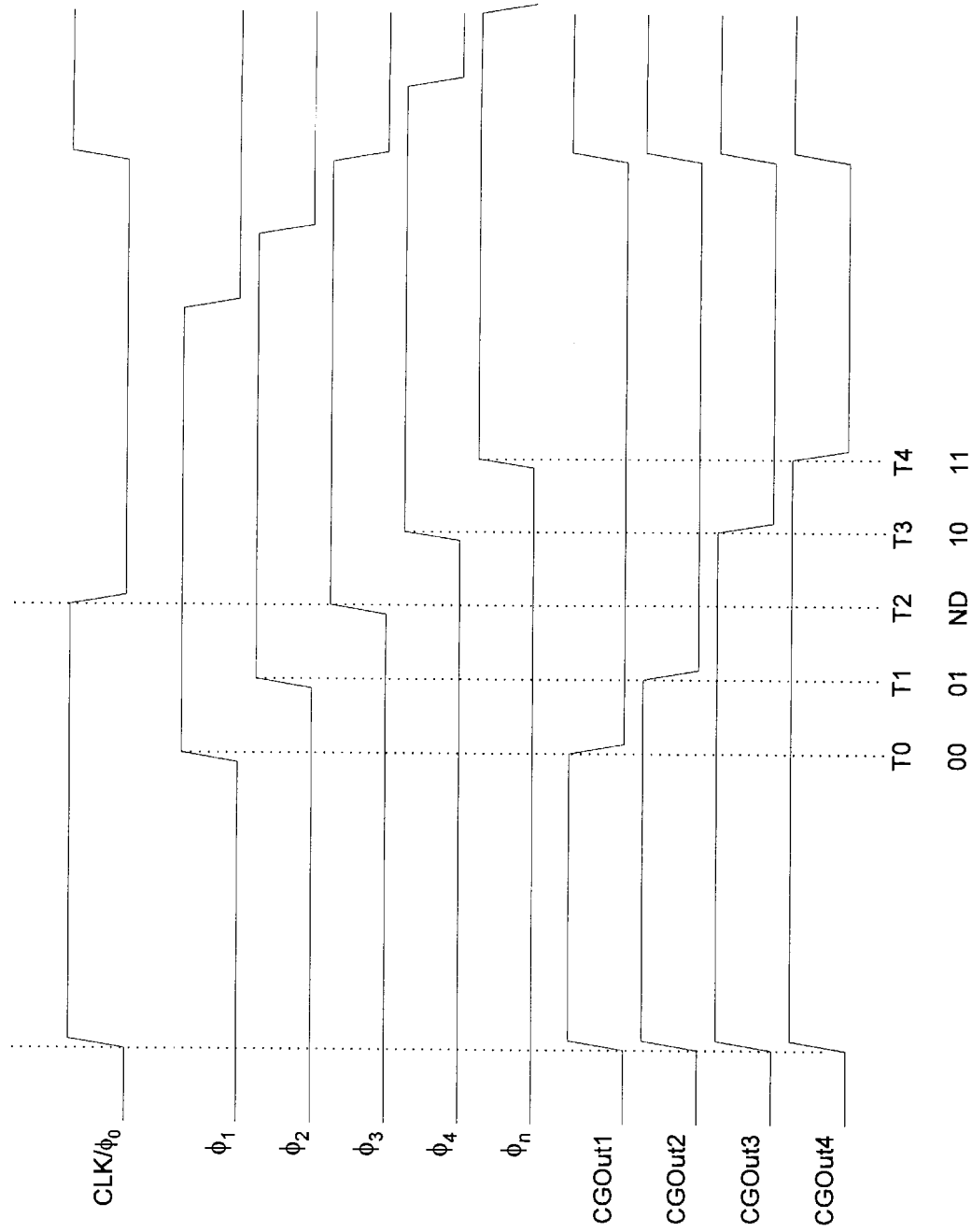


Figure 4

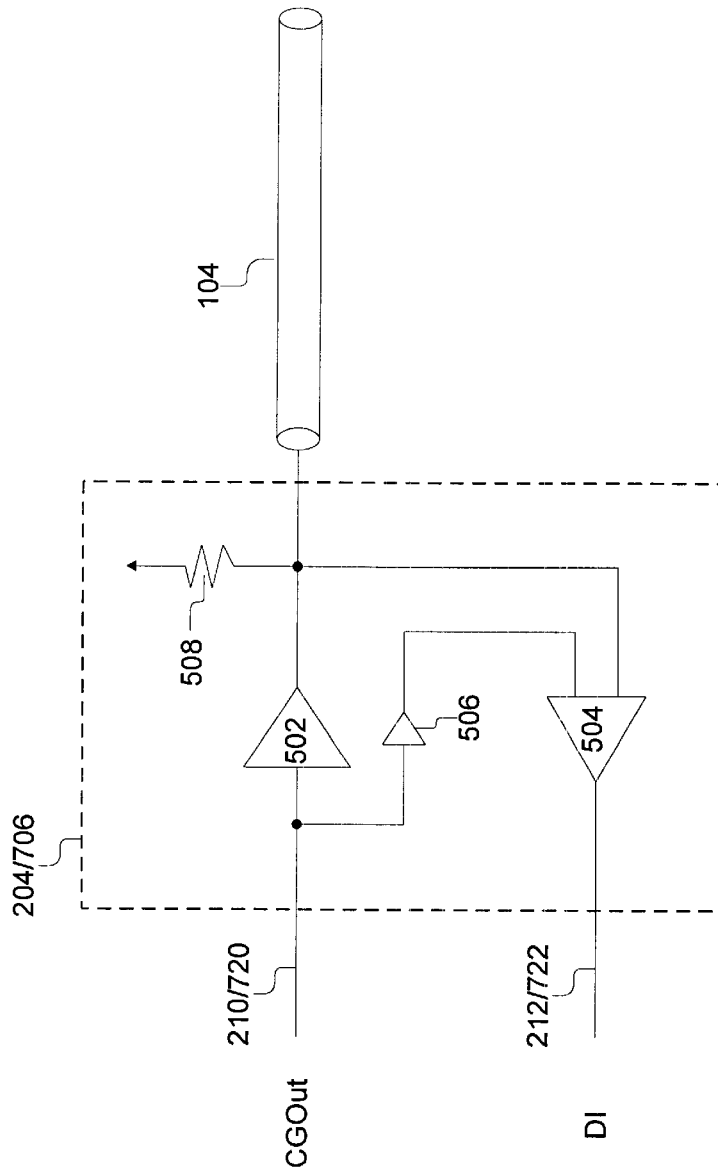


Figure 5A

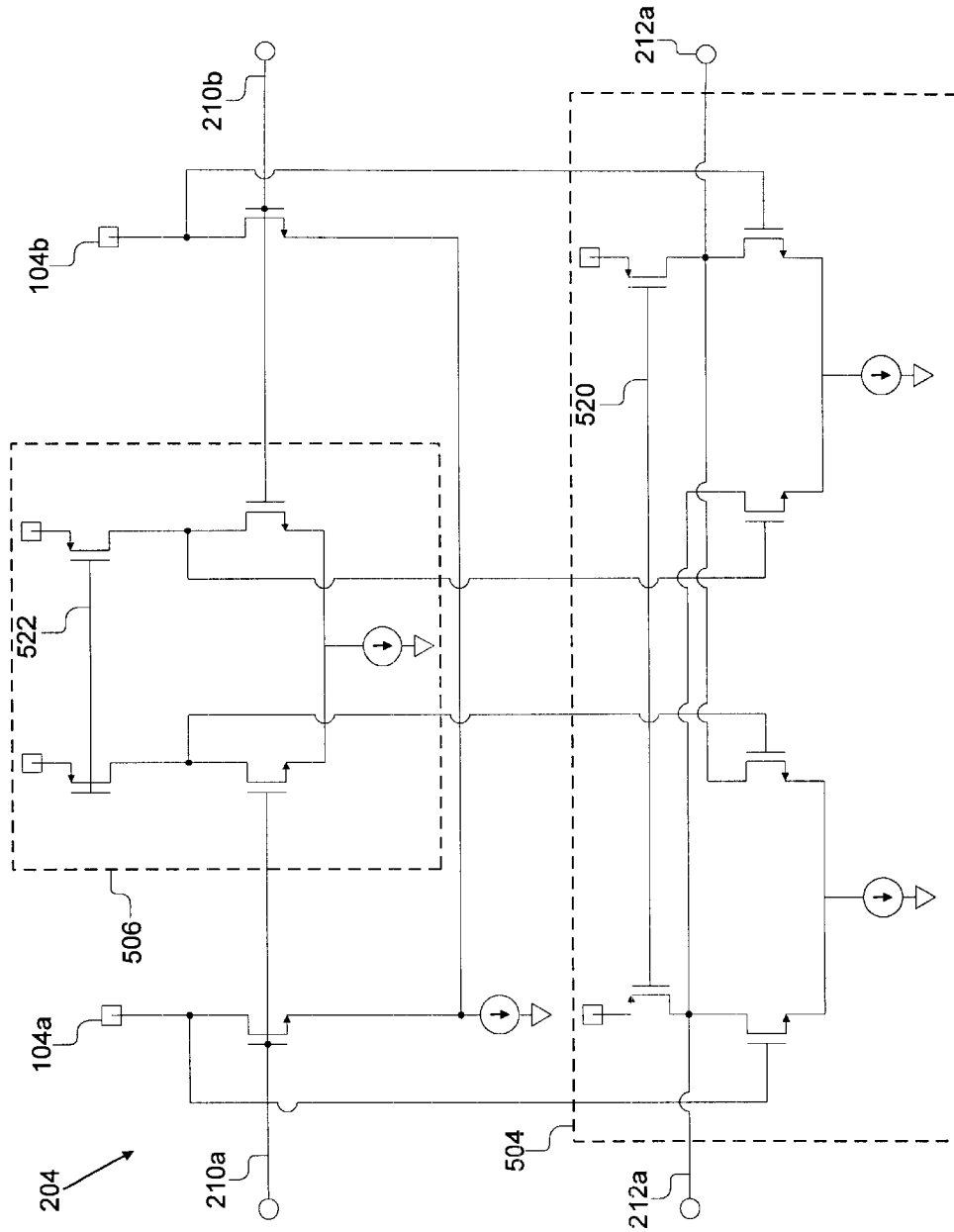


Figure 5B

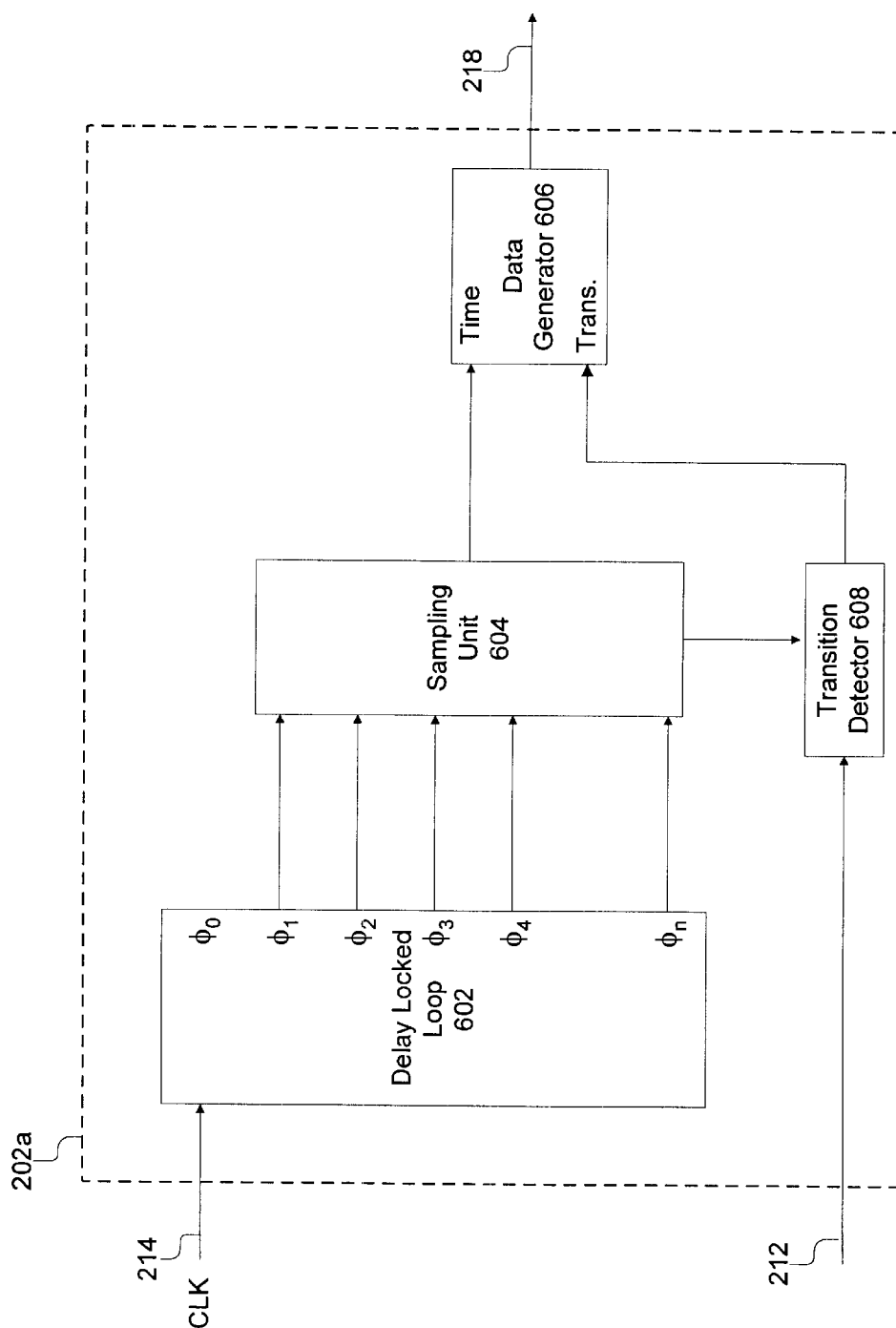


Figure 6A

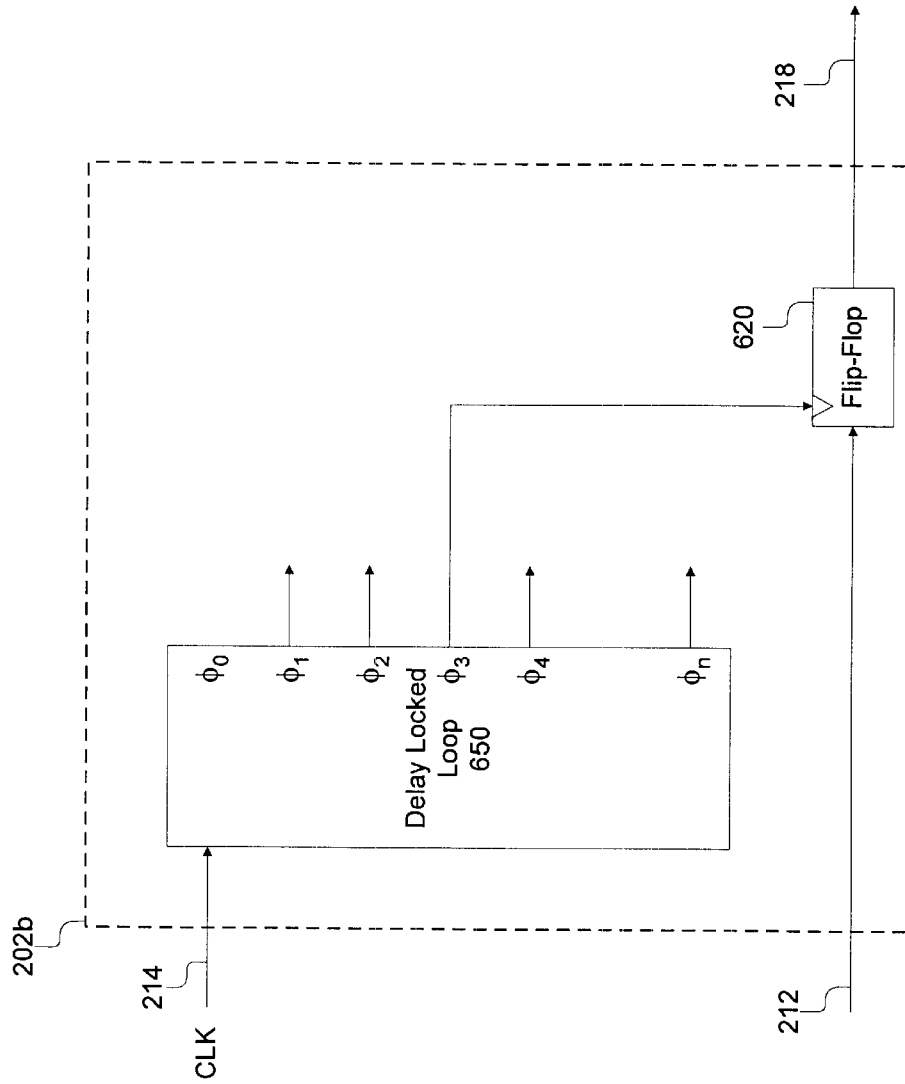


Figure 6B

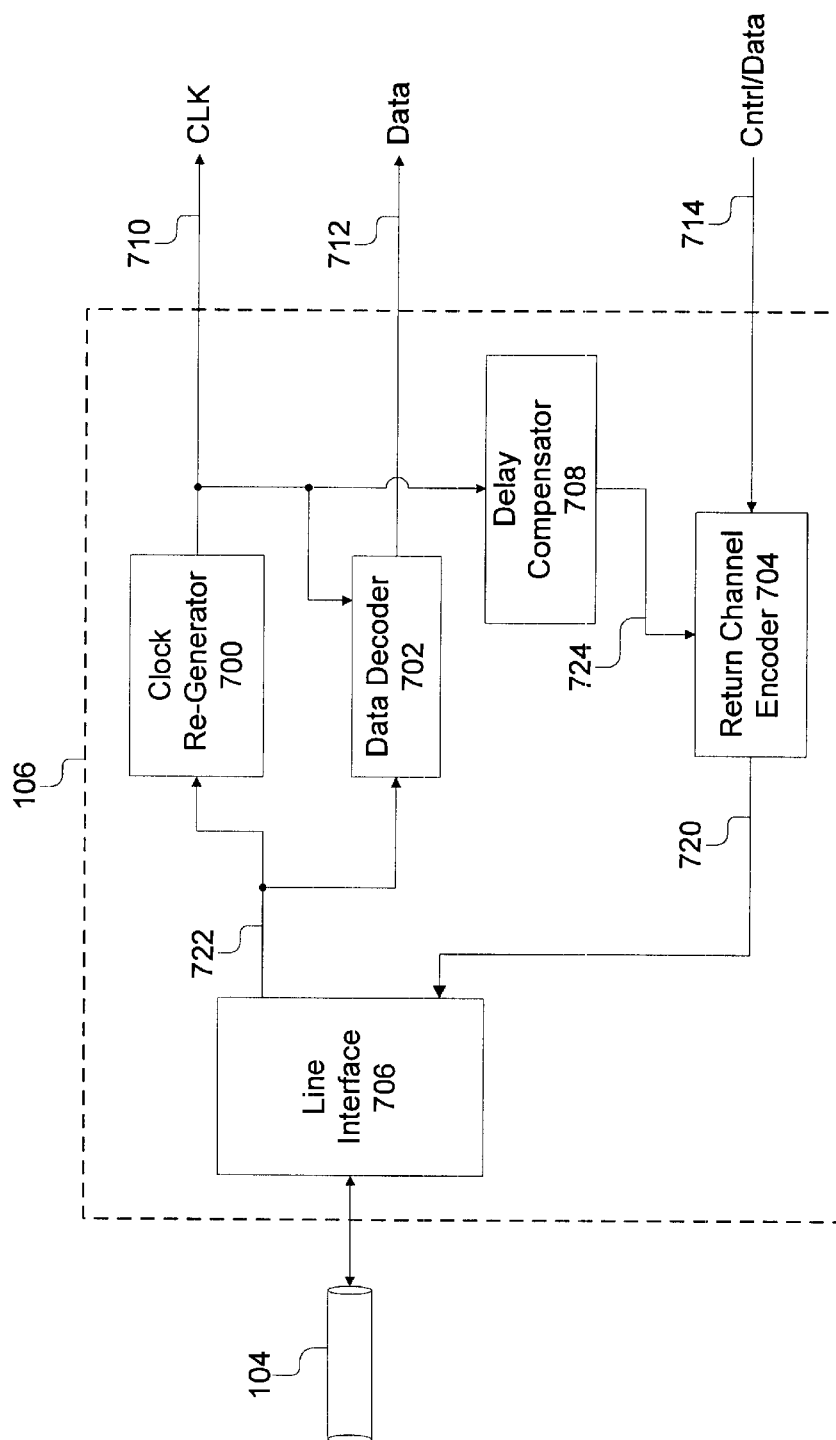


Figure 7

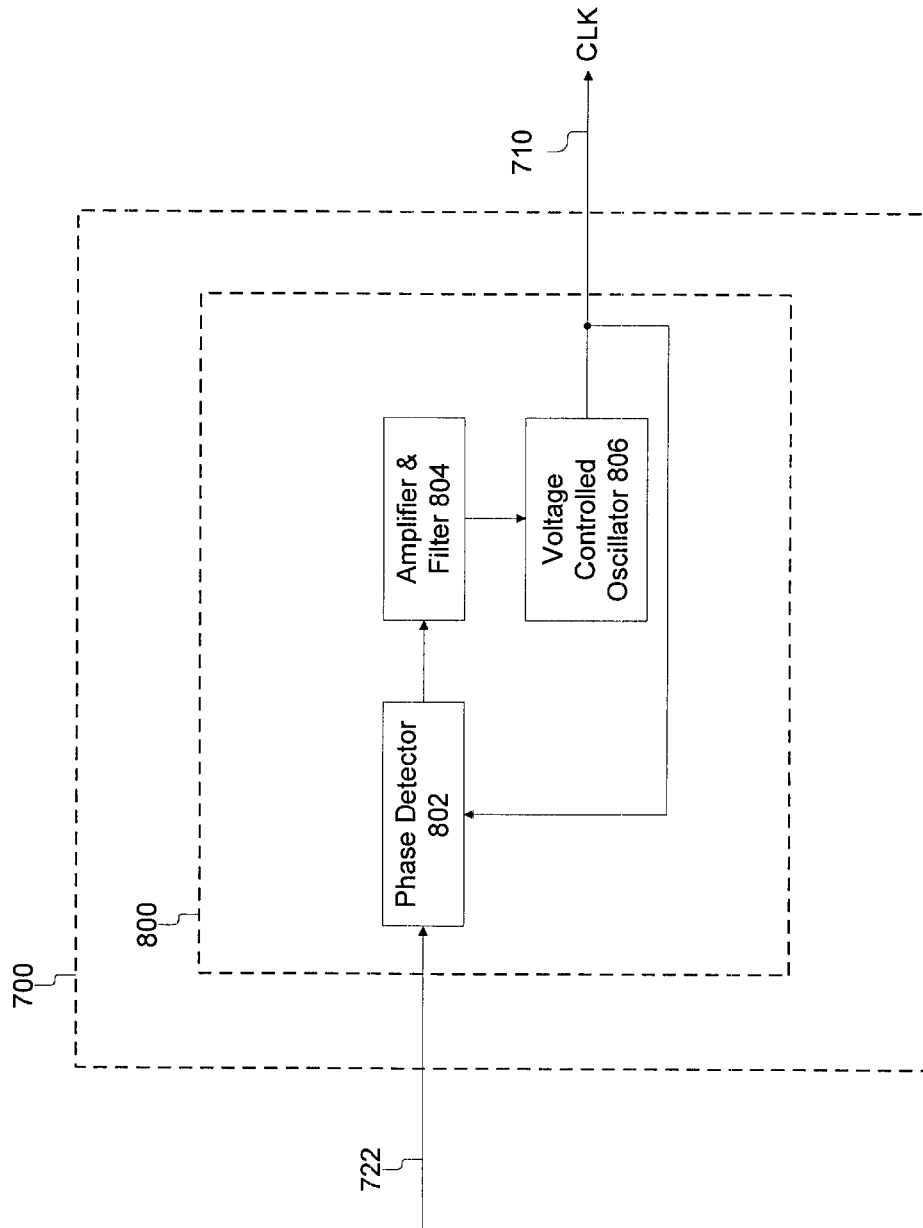


Figure 8

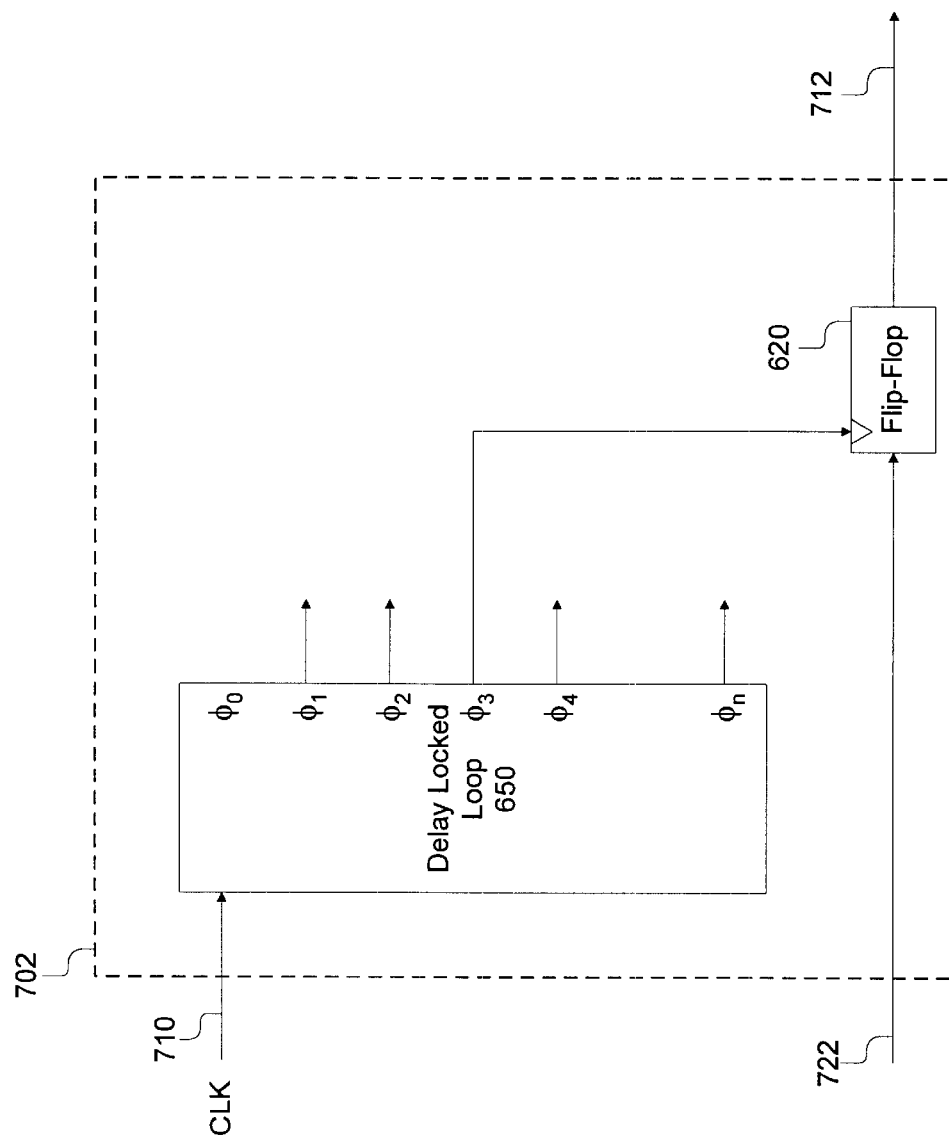


Figure 9

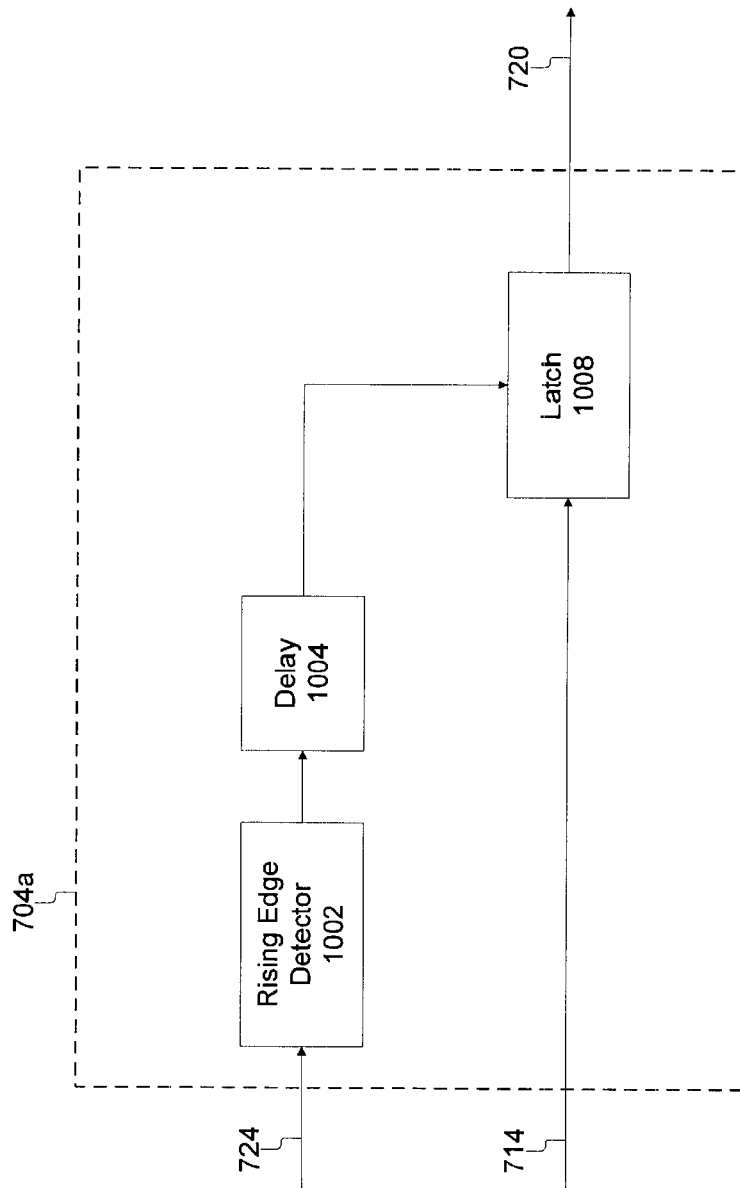


Figure 10A

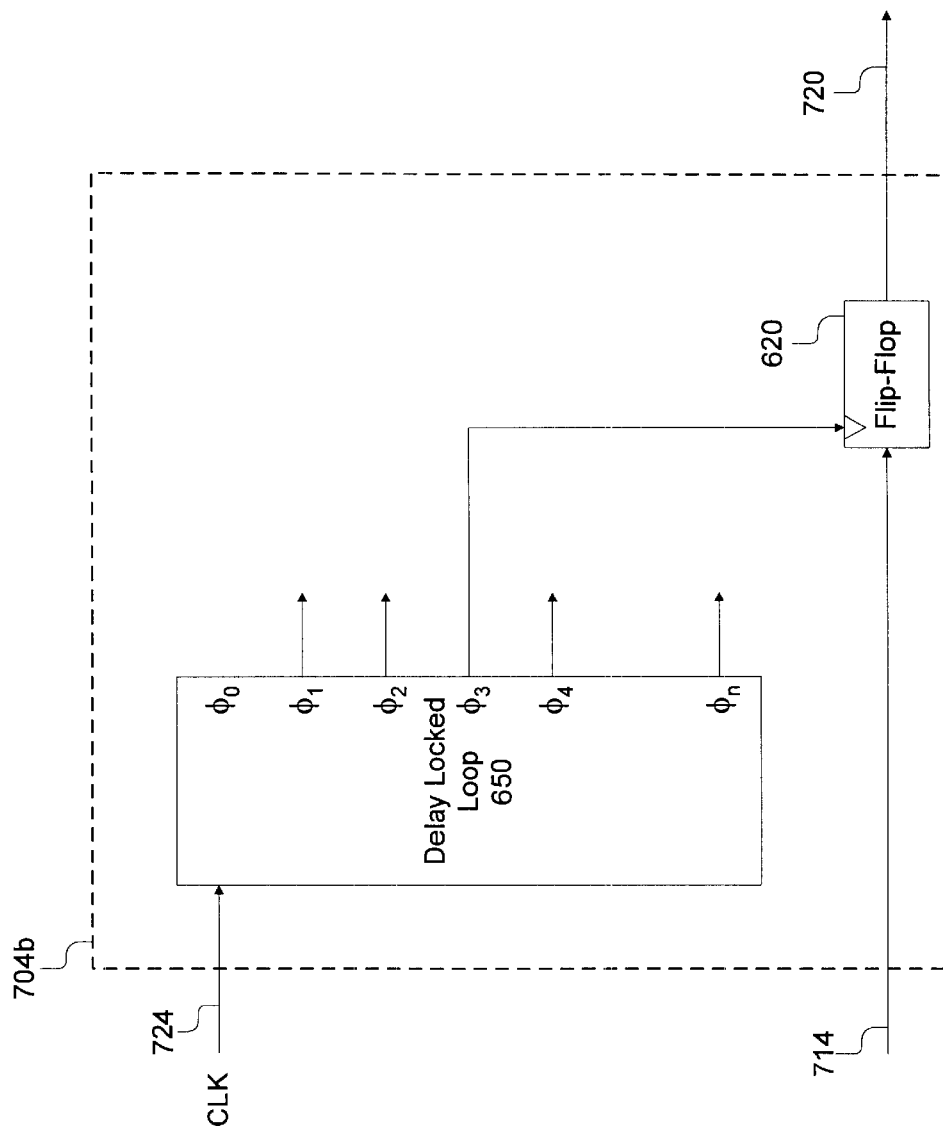


Figure 10B

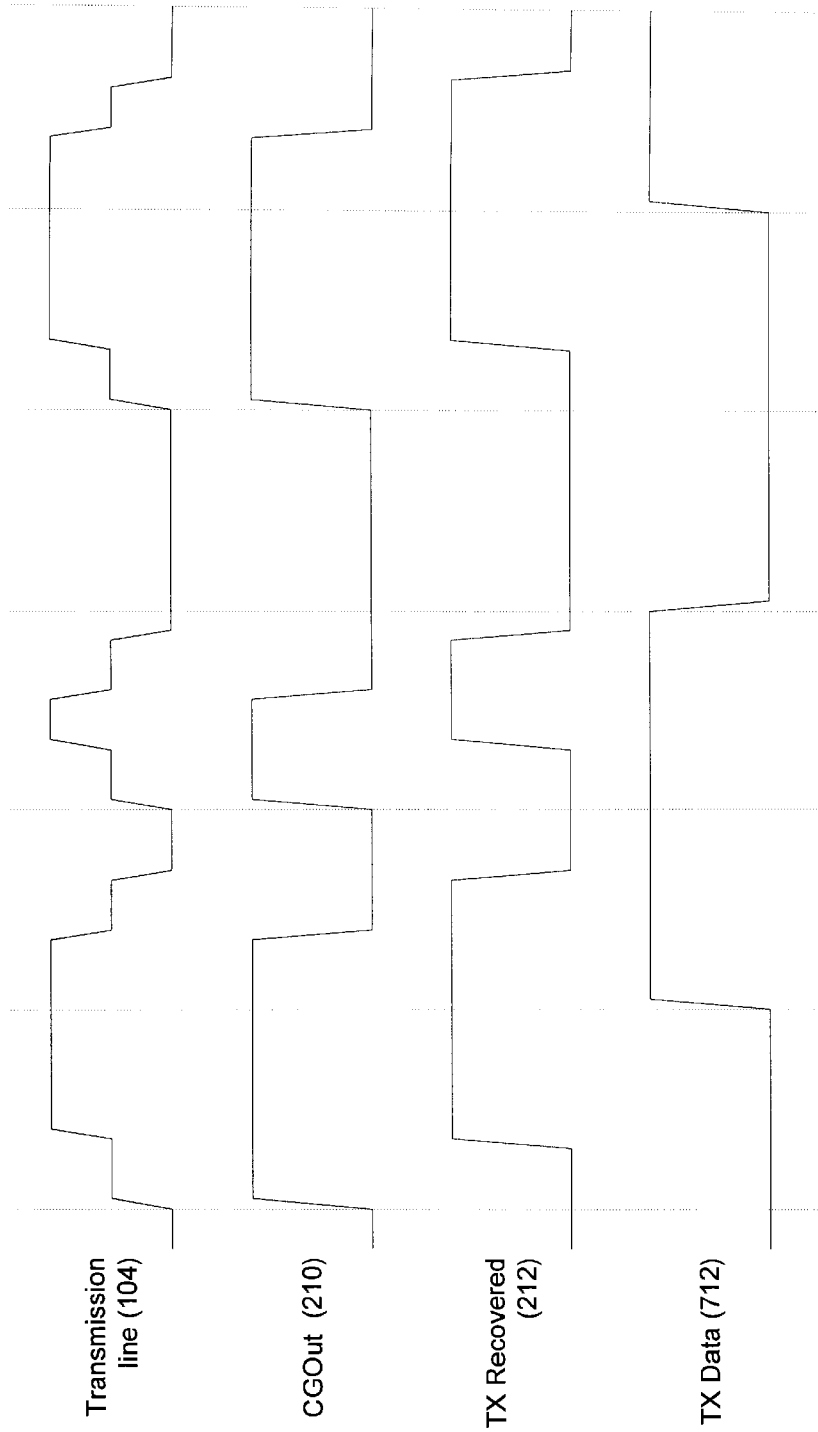


Figure 11A

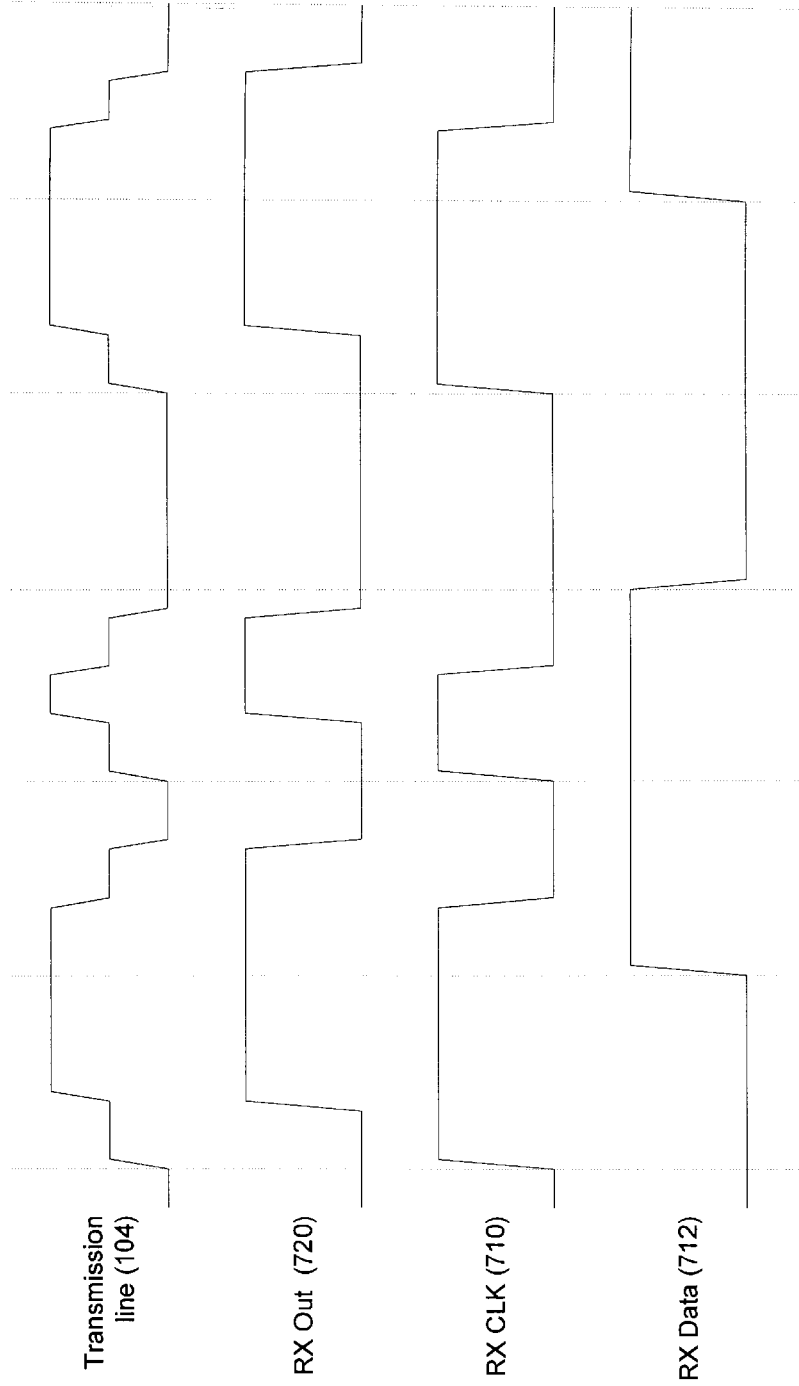


Figure 11B

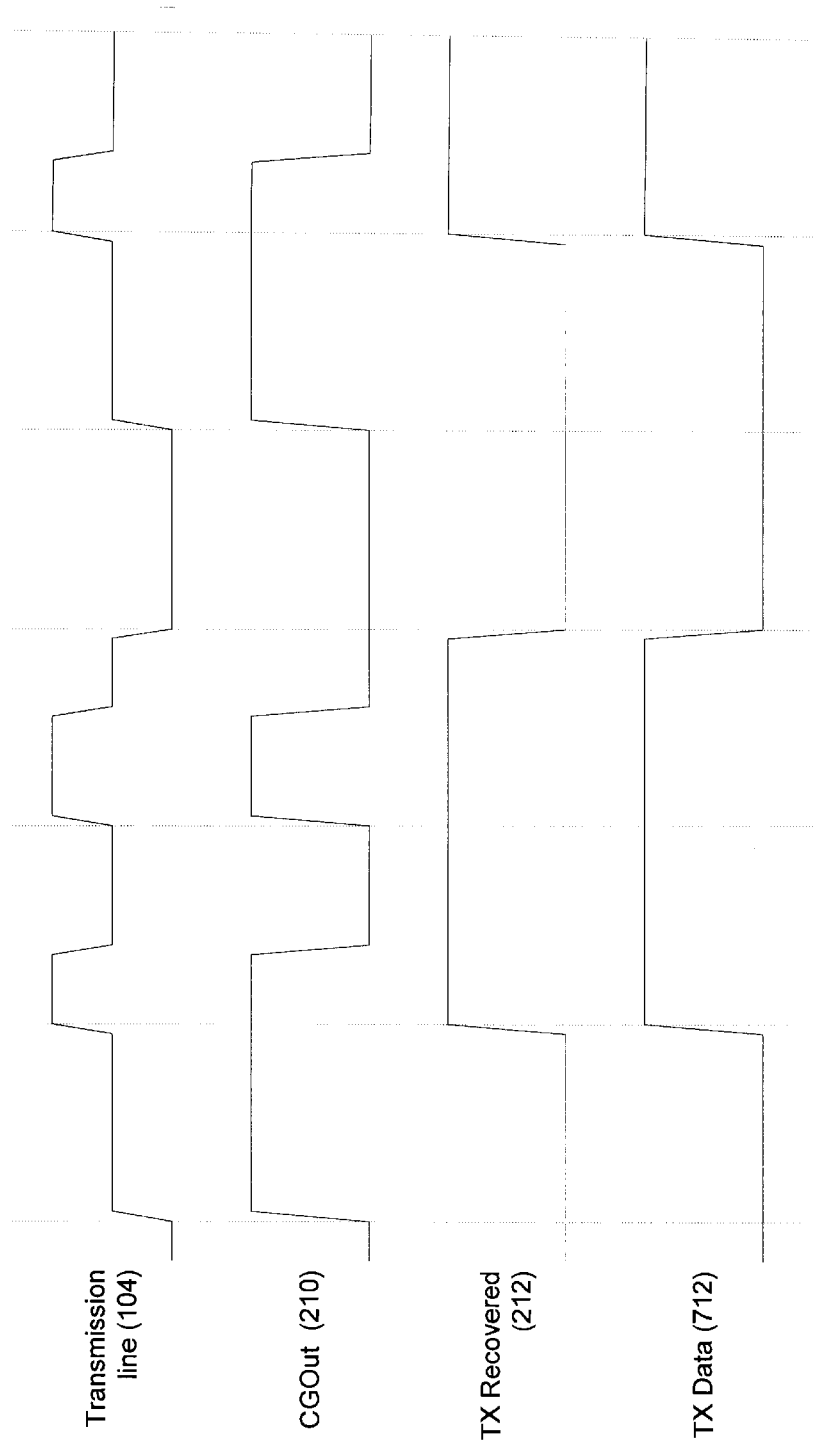


Figure 12A

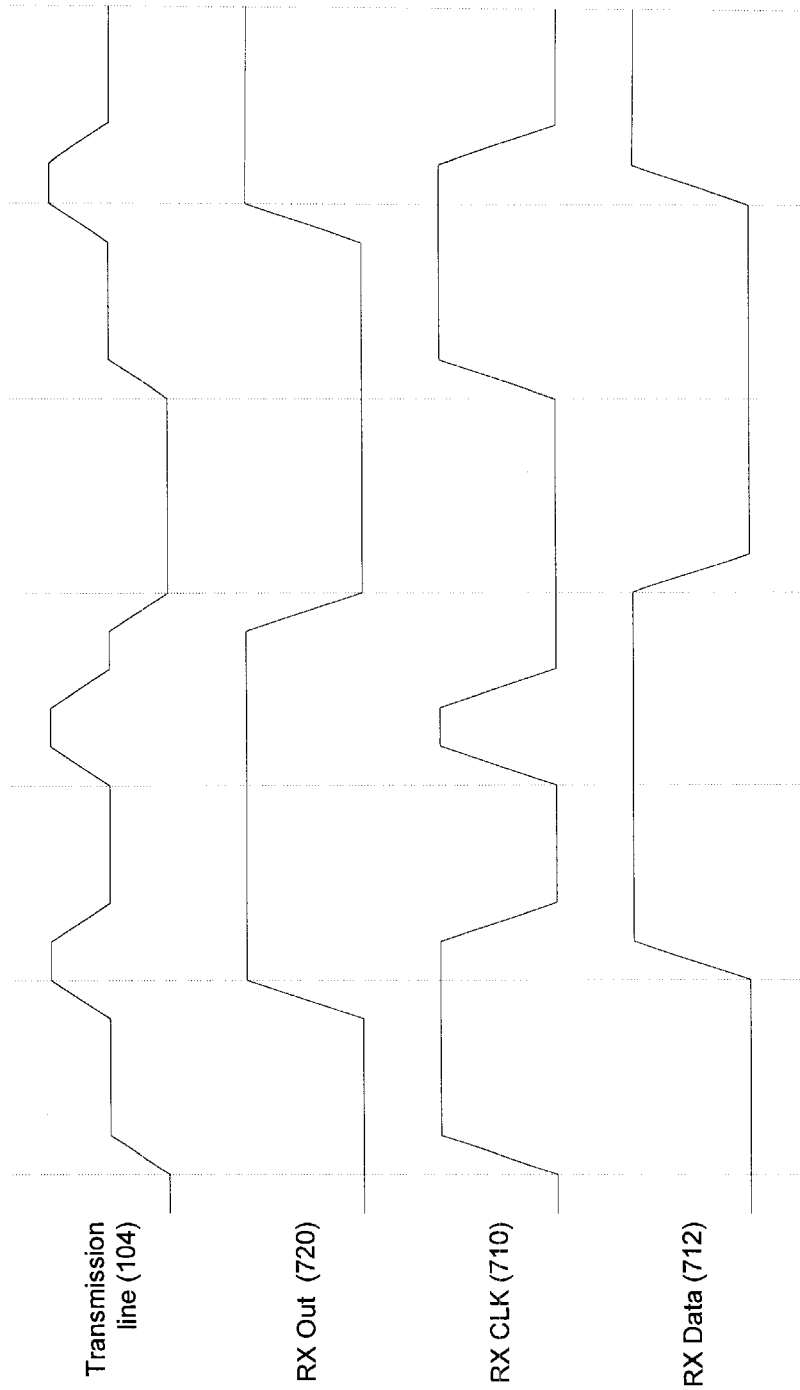


Figure 12B

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SYSTEM AND METHOD FOR SENDING AND RECEIVING DATA SIGNALS OVER A CLOCK SIGNAL LINE

This application claims benefit of provisional No. 5
60/099,770 filed Sep. 10, 1998.

CROSS-REFERENCES TO RELATED APPLICATIONS

This application is a utility conversion of U.S. Pat. No. 10
60/099,770, entitled "Embedded Back Channel For TMDS"
by Gydong Kim, filed Sep. 10, 1998.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to the field of data
communications, and more particularly, to the transmission
of clock and data signals. Still more particularly, the present
invention relates to the transmission of clock signals and
data signals on the same transmission line in transition
minimized differential signaling (TMDS) system.

2. Description of the Background Art

There are a variety of prior art systems and method for
transmitting data between a transmitter and a receiver. 25
Various serial links and other methods for transmitting data
and clock signals are well known. However, most such
schemes provide a single line or channel dedicated for the
transmission of the clock signals and other signal lines or
channels dedicated for the transmission of data. Once such
system is described by Kyeongho Lee, Sungjoon Kim,
Gijung Ahn, and Deog-kyoon Jeong in "A CMOS Serial
Link For Fully Duplexed Data Communication," IEEE
Journal of Solid State Circuits, Vol. 30, No. pp. 353-364, 30
April 1995.

The present invention will be discussed in the context of
transition minimized differential signaling (TMDS),
however, those skilled in the art will recognize that the
present invention is applicable in various other data com-
munication contexts. In TMDS, four signal lines are
provided, and each signal line is preferably a differential
pair. One signal line is for a low speed clock signal and the
three other signal lines are for high-speed data transmission.

One important aspect of all data communication systems
is to maximize the bandwidth provided by the data. chan-
nels. However, most systems include a variety of control
signals that must be sent between the transmitter and the
receiver to ensure proper operation, and maintain synchro-
nization between the transmitter and the receiver. For
example, it is not uncommon for as much as 20% of the
bandwidth to be used for framing and synchronization in
serial communication. One problem is that the bandwidth
available for data is typically reduced because the data
signal lines must be used to transmit these control signals
between the transmitter and receiver. Yet another problem is
latency in transmitting the control signals to the recipient.
Especially in video data communication, much of the data
must be transmitted in blocks during which control signals
cannot be sent. For example, when transmitting data from a
controller to a flat panel, the data is transmitted, and then
there is a data enable period corresponding to the blanking
period in CRT display that is used to send control and
synchronization signal. Only during that data enable period
can the control signals be sent under most protocols. 65
Therefore, there is latency imposed on transmitting control
signals to the receiver. Thus, there is need for a system that

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can provide for control signaling between the transmitter
and the receiver without decreasing the available bandwidth
for data transfer, and while reducing the latency in sending
control signals.

Yet another problem in the prior art is that most systems
do not provide a mechanism to get signals from the receiver
back to the transmitter. In other words, there is not a return
channel for communication. Some systems have provided
additional signal lines, however, their addition and interface
add significant complication, require re-wiring and create
other problems that make the addition of a physical line
unworkable. Another approach is to add a second
transmitter, second receiver and signal lines. However, this
essentially doubles the hardware requirements making such
a solution too expensive. Furthermore, such duplication is
overkill for the amount of data that needs to be sent between
the transmitter and the receiver, especially when the appli-
cation is one of sending video data from a transmitter to a
receiver such as communication between a graphic control-
ler and a video display device.

Therefore, there is a need for a system and method for that
uses the clock signal line also for transmitting data signals
between the transmitter and the receiver and vice-versa.

SUMMARY OF THE INVENTION

The present invention overcomes the deficiencies and
limitations of the prior art with a unique data communication
system. The system preferably includes a unique transmitter
and receiver coupled by a transmission line. The transmitter
sends both a clock signal and data signals over the trans-
mission line to the receiver. The receiver uses the same
transmission line to send data signals back to the transmitter.

The transmitter preferably comprises a clock generator, a
decoder and a line interface. The clock generator produces
a clock signal that includes a variable position falling edge.
The falling edge position is decoded by the receiver to
extract data in addition to the clock signal. The line interface
couples the output of the clock generator to the transmission
line. The line interface also couples the transmission line to
the decoder and in doing so removes the signals from the
clock generator. The decoder receives the signals from the
line interface and decodes the signal to determine the data
being sent from the receiver to the transmitter on the same
line used to send the clock and data from the transmitter to
the receiver.

The receiver preferably comprises a line interface, a clock
re-generator, a data decoder and a return channel encoder.
The clock re-generator, the data decoder and the return
channel encoder are coupled to the transmission line by the
line interface. The clock re-generator monitors the transmis-
sion line, receives signals, filters them and generates a clock
signal at the receiver from the signal on the transmission
line. The data decoder similarly is coupled to receive the
signals on the transmission line, and filters and decodes the
signals to produce data signals. This is preferably done by
determining the position of the falling edge of the clock
signal and translating the falling edge position into bit
values. In contrast, the return channel encoder generates
signals and asserts them on the transmission line. These
signals are asserted or superimposed over the clock & data
signals provided by the transmitter.

These and other features and advantages of the present
invention may be better understood by considering the
following detailed description of a preferred embodiment of
the invention. In the course of this description, reference will
frequently be made to the attached drawings.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of system including the combined clock and data signal line of the present invention.

FIG. 2 is a block diagram of a portion of the transmitter showing a clock generator, decoder and a line interface.

FIG. 3 is a block diagram of a preferred embodiment of the clock generator constructed in accordance with the present invention.

FIG. 4 is a timing diagram illustrating various clock signals that the clock generator of the present invention produces.

FIG. 5A is a block diagram of a preferred embodiment of the line interface constructed in accordance with the present invention.

FIG. 5B is a circuit diagram of the preferred embodiment of the line interface constructed in accordance with the present invention.

FIG. 6A is a block diagram of a first embodiment of the decoder at the transmitter constructed in accordance with the present invention.

FIG. 6B is a block diagram of a second embodiment of the decoder at the transmitter constructed in accordance with the present invention.

FIG. 7 is a block diagram of a first embodiment of portions of the receiver relating to the present invention.

FIG. 8 is a block diagram of a first embodiment of a clock re-generator of the receiver.

FIG. 9 is a block diagram of a preferred embodiment of a data decoder of the receiver.

FIG. 10A is a block diagram of a first embodiment of a return channel encoder of the receiver.

FIG. 10B is a block diagram of a second and alternate embodiment of a return channel encoder of the receiver.

FIG. 11A is a timing diagram illustrating signals on the transmission line, and the clock and data signals generated by the transmitter for return to zero signaling.

FIG. 11B is a timing diagram illustrating signals on the transmission line, the data signal sent by the receiver, and the clock and data signals recovered by the receiver for return to zero signaling.

FIG. 12A is a timing diagram illustrating signals on the transmission line, and the clock and data signals generated by the transmitter for non-return to zero signaling.

FIG. 12B is a timing diagram illustrating signals on the transmission line, the data signal sent by the receiver, and the clock and data signals recovered by the receiver for non-return to zero signaling.

DETAILED DESCRIPTION OF THE
PREFERRED EMBODIMENTS

Referring now to FIG. 1, a block diagram of system 100 including the combined clock and data signal line of the present invention is shown. The system 100 preferably includes a transmitter 102, a clock transmission line 104, a receiver 106 and one or more data transmission lines 108. The transmitter 102 preferably provides a clock signal as well as data signals to the receiver 106 via the clock transmission line 104. These data signals are in addition to those provided to the receiver 106 via the high speed data transmission lines 108. The receiver 106 receives the signals on the transmission line 104 and from them, generates the clock and data signals at the receiver 106. These data signals on the clock line 104 are again in addition to the data signals

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that the receiver 106 recovers from the data transmission line 108. The transmitter 102 and the receiver 106 include logic for sending and receiving the data from data transmission line 108. This logic preferably includes transition control, DC balancing, and encoding/decoding in a conventional manner. For example, in addition to the components of the present invention for receiving and sending data and clock signals on the clock transmission line 104 that will be described below, the transmitter 102 and the receiver 106 respectively include conventional data transmission logic for TMDS such as that provided in PanelLink by Silicon Image of Cupertino, Calif. For ease of understanding that logic and the data transmission line 108 are omitted from the discussion below and the remaining figures. Those skilled in the art will also realize that while shown as a single line, the clock transmission line 104 and the data transmission line 108 are preferably each a differential pair of signal lines, and the signal is carried on the differential pair of lines. Furthermore, those skilled in the art will understand the preferred embodiment for the data transmission line 108 is three pairs of data lines.

Transmitter

Referring now to FIG. 2, a preferred embodiment of the transmitter 102 is shown in more detail. The transmitter 102 preferably comprises a clock generator 200, a line interface 204, and a decoder 202.

The clock generator 200 has a first input, a second input and an output. The clock generator 200 produces a clock signal that is encoded with data. The data is encoded into the clock signal by varying the modulation of the falling edge of the clock signal. In other words, the position of the falling edge of the clock relative to the rising edge indicates different data values. This is particularly advantageous because it preserves the rising edge of the clock for clock recovery. All the activity for a bi-directional data link on the clock transmission line 104 is centered around the falling edge of the clock from the transmitter 102. While most of the present invention will be described in the context of the falling edge of the clock having two different positions, FIG. 3 and will also be described in the context of the falling edge of the clock having five different positions. Each of the four positions representing two bit values and one position representing no data. The first input of the clock generator 200 is coupled to line 214 to receive a clock signal either from another portion of the transmitter 102 or from an oscillator or other conventional clock source. The second input of the clock generator 200 is coupled to line 216 to receive control/data signals. These control/data signals dictate the data or no data that is transmitted as part of the clock signal. These control/data signals may be from another portion of the transmitter 102 or from off chip control logic. The output of the clock generator 200 is provided on line 210 that is coupled to an input of the line interface 204. The output of the clock generator 200 provides a CGOut signal.

While the present invention is described throughout this application as preserving the rising edge for the clock signal and centering all the bi-directional data transmission about the falling edge, those skilled in the art will realize that an inverse scheme where the falling edge is preserved for recovering the clock and changes in position of the rising edge is used for encoding data is within the spirit and scope of the present invention.

The line interface 204 has an input, an output and a bi-directional port. The line interface 204 couples the clock generator 200 and the decoder 202 to the clock transmission line 104. The input of the line interface 204 preferably couples line 210 to the clock transmission line 104 so that

the CGOut signal may be asserted over the clock transmission line **104**. The output of the line interface **204** is coupled to the input of the decoder **202** by line **212**. The line interface **204** advantageously receives the signal on the clock transmission line **104**, removes the CGOut signal as will be described below with reference to FIGS. **5A** and **5B**, and sends the filtered signal as the input to the decoder **202**. The bi-directional port of the line interface **204** is coupled to the clock transmission line **104**.

The decoder **202** receives the filtered signals from the transmission line **104** and decodes the signals to generate the data sent by the receiver **106**. The decoder **202** preferably performs an inverse function to the encoder **704** (See FIG. **7**) of the receiver **106** as will be described below.

Referring now to FIGS. **3** and **4**, the preferred embodiment for the clock generator **200** will be described. While the clock generator **200** will now be described as providing a clock signal having a falling edge in five possible locations to send two bits of data or no data in addition to the clock signal, those skilled in the art will recognize that this is only by way of example. The clock generator **200** could be configured to send from 1 to n bits of data per clock cycle depending on the clock frequency and the number of possible locations for the falling edge of the clock signal. In general, n locations of the falling edge will allow up to $\log_2 n$ bits of data to be transferred per clock cycle. The number of locations for the falling edge is limited only in that the first location must be such that the pulse width is greater than the logic-threshold crossing time of the rising edge, which may be viewed to be jitter by the phase-locked loop at the receiver **106**. In other words, the thresholds for set up and hold time in the logic must be sufficient to recognize a rising edge as the beginning of the clock cycle.

The clock generator **200** preferably generates a clock signal at the dot clock frequency, or the frequency used by device (not shown) connected to the receiver **106** for the display of the data. The maximum symbol rate provided by data transfer as part of the clock signal matches the dot clock frequency. For example, if the dot clock is 100 MHz, the symbol rate is 100 Msymbols/s. The actual data rate will depend on the modulation methods and the number of bits per clock or symbol that can be sent. If simple binary modulation is used, then the bit rate is the same and the clock rate with would provide an additional 100 Mb/s for control signals.

The clock generator **200** preferably comprises a monostable multivibrator **306**, a delay-locked loop **300**, a multiplexer **302**, a first NAND gate **304** and a second NAND gate **306**. The clock generator **200** preferably uses only return to zero signaling for sending the clock and data signals. Non-return to zero signaling cannot be used for sending from the transmitter **102**. The clock signal is received on line **214** and provided as input to the input of the one shot or monostable multivibrator **306**. The monostable multivibrator **306** is provided to generate a signal with a narrower pulse width than the clock signal. This is advantageous for use in other portions of the clock generator **200**. In an alternative embodiment, the one shot **306**, may be replaced by a plurality of monostable multivibrators each respectively coupled in series with an output signal line **308** of the delay locked loop **300**. Such an alternate embodiment provides more flexibility in the design of the delay locked loop **300** at the cost of additional monostable multivibrators will be understood by those skilled in the art. The output of the monostable multivibrator **306** is coupled to the input of the delay-locked loop **300**. The delay-locked loop **300** is of a conventional type and in response to a signal at its input,

provides a plurality of outputs, each output being the same as the input only shifted in phase. The falling edge is modulated using a delay-locked loop **300**. The falling edge is chosen from one of the phases provided by the delay-locked loop **300**. It is preferable that the selected phases from the delay-locked loop **300** be the ones close to a 50% duty cycle. The delay-locked loop **300** preferably provides five output signals: $\phi 0$, $\phi 1$, $\phi 2$, $\phi 3$, $\phi 4$, and ϕn . The $\phi 0$ signal is the clock signal unchanged. The $\phi 1$, $\phi 2$, $\phi 3$, $\phi 4$, and ϕn are each phase shifted more with respect to the previous ϕ signal. The $\phi 0$ is coupled to a first input of the first NAND gate **304**. The output of the first NAND gate **304** is provided on line **210** and provides the CGOut signal. The first NAND gate **304** is cross coupled with the second NAND gate **306** to form a set-reset latch. A rising edge on the $\phi 0$ causes the output of first NAND gate **304** to be set high or asserted until reset to low by the second NAND gate **306**. The remaining signals from the delay-locked loop **300**, $\phi 1$, $\phi 2$, $\phi 3$, $\phi 4$, and ϕn are coupled to respective data inputs of the multiplexer **302**. The control input of the multiplexer **302** is coupled to line **216** to receive control/data signals. In response to the control/data signals on line **216**, the multiplexer **302** will couple one of the signals from the delay-locked loop **300**, $\phi 1$, $\phi 2$, $\phi 3$, $\phi 4$, and ϕn , to the input of the second NAND gate **306**. Thus, the rising edge on the selected signal from the delay-locked loop **300**, $\phi 1$, $\phi 2$, $\phi 3$, $\phi 4$, and ϕn , will cause the latch to be reset and create a falling edge on the output of the first NAND gate **304**, and thus, line **210**. Thus, it is apparent that using the control/data signals to select one of the signals, the position of the falling edge can be selected. For example control signals such as shown in Table I may be used to control the position of the falling edge.

TABLE I

Control/data Signal (216)	NAND-gate 306 input	Falling edge Position	Data Sent
000	$\phi 1$	T0	00
001	$\phi 2$	T1	01
100	$\phi 3$	T2	00
010	$\phi 4$	T3	10
011	ϕn	T4	11

Those skilled in the art will recognize how the clock generator **200** could be modified to create any number of different falling edge positions for the CGOut signal. Referring also to FIG. **4**, a timing diagram of the clock/ $\phi 0$, $\phi 1$, $\phi 2$, $\phi 3$, $\phi 4$, and ϕn and the possible CGOut signals are shown. There are five possible CGOut signals. First, the clock/ $\phi 0$ signal is unchanged which is just the input signal with falling edge at time T2 and sending no data. The remaining CGOut1–CGOut4 signals are have a falling edge with an adjusted position to times T0, T1, T3, T4 respectively each representing a different two bit value. Thus, the preferred embodiment is able to transfer two bits per clock from the transmitter **102** to the receiver **106** in addition to the clock signal. Since the receiver **106** uses only the rising edge to detect and define clock cycles, the present invention uses this to achieve the data transfer without any performance disadvantages. For the receiver **106** embodiments described below where only one bit of data per clock is sent, the clock generator **200** would output falling edges at times T1 and T3.

The ability of the present invention to use the clock transmission line **104** to send data from the transmitter **102** to the receiver **104** is particularly advantageous because it eliminates signal latency present in the prior art. With the present invention as applied to TMDS, the transmitter **102** does not need to wait for the next available data enable (DE)

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low period to send the signals. This greatly decreases the maximum transfer latency. Moreover, the present invention can be used in other serial links that require very short latency. For example, if a fixed bit location is assigned for each link (a fixed bandwidth per fixed dot clock) the synchronization overhead for those channels can be minimized. In this way, the latency of such links can be reduced to 1 frame cycle and the cable flight time. The other bits of the payload can be used with variable bandwidth but the synchronization latency or delay could be longer.

Yet another advantage of the forward channel for sending data from the transmitter **102** to the receiver **106** is that it is fully backward compatible with prior TMDs designs and protocols. Thus, whether the receiver **106** is able to receive data from the transmitter **102** or not, the clock signal is unaffected by the addition of data to the signal. Moreover, a receiver **106** will not have a problem recovering the clock even if data (for either the transmitter **102** or the receiver **106**) is added in accordance with the present invention to the signal on the transmission line **104**. Therefore, the transmitter **102** of the present invention can still be used even if the receiver does not have the capability to receive the data signal.

Referring now to FIGS. **5A** and **5B**, the preferred embodiment for the line interface **204** is shown. The line interface preferably comprises a first amplifier **502**, a second amplifier **506**, a differential amplifier **504** and a line terminator or pull-up resistor **508**. The line interface **204** is essentially a bi-directional bridge that allows transmission of data while receiving data from the receiver **106**. The input of the first amplifier **502** is coupled to line **210** to receive the CGOut signal. The input of the second amplifier **506** is similarly coupled. The output of the first amplifier **502** is coupled to apply an amplified version of the CGOut signal to clock transmission line **104**. The clock transmission line **104** is also coupled by the pull-up resistor **508** to high voltage to form a line terminator. The pull-up resistor **508** could instead be coupled to ground or half V_{DD} as will be understood to those skilled in the art for alternate embodiments of the line terminator. The clock transmission line **104** is also coupled an input of the differential amplifier **504**. The other input of the differential amplifier **504** is coupled to the output of the second amplifier **506**. The second amplifier **506** also receives the CGOut signal and amplifies the signal, but to the same or lesser extent than the first amplifier **502**. The differential amplifier **504** subtracts the CGOut signal from the signal received from the clock transmission line **104**. Thus, the output of the differential amplifier **504** that is provided on line **212** includes predominately the signals asserted by the receiver **106** on the clock transmission line **104** and not the CGOut signal. It should be noted that an identical circuit with inputs and output coupled differently may also be used in the receiver **106** as will be described below with reference to FIG. **7**.

Referring also now to FIG. **5B**, a circuit diagram for one exemplary embodiment for the line interface **204** is shown. The connections to the signal lines **210** and **104** are shown with reference numerals for clarity and ease of understanding. The signals preferably use differential pairs are indicated by reference numerals "a" and "b" as will be understood to those skilled in the art. The transistors and other components forming the second amplifier **506** and the differential amplifier **504** are shown grouped within dashed boxes as will be understood to those skilled in the art. The remaining transistors and other components from the first amplifier (not labeled in FIG. **5B**). It should be noted that some of the transistors in the second amplifier **506** are for

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impedance matching, and have their gates coupled to signal line **522** to be biased for impedance matching in a conventional manner. Some of the transistors in the differential amplifier **504** are also coupled to line **520** for biasing. In alternate embodiments, the outputs of the differential amplifier **504** could be coupled to line **520** and thereby provide a single output signal as will be realized by those skilled in the art. Those skilled in the art will further recognize that in alternative embodiments, various other conventional bi-directional buffers could be used in place of the circuits shown in FIGS. **5A** and **5B**.

Referring now to FIGS. **6A** and **6B**, two alternate embodiments for the decoder **202** are shown. The embodiment for the decoder **202** is dependent on the type of signaling being used by the corresponding encoder **704** (See FIG. **7** and below) in the receiver **106**. FIG. **6A** shows a block diagram of the first embodiment of the decoder **202a** at the transmitter **106** for use when the receiver **106** sends the data in a non-return to zero (NRZ) signaling. As shown in FIG. **6A**, when the receiver **106** sends data in NRZ (non-return to zero) manner and toggles data at the fictitious falling edge (since the clock toggles its falling edge randomly in accordance with the present invention), since the delay is a function of cable delay, at the transmitter side, it is not predictable where the relative location of the data transition will be, even though it may have been obvious at the receiver side. Because of this ambiguous delay, the decoder **202a** oversamples the data provided from the clock transmission line **104/212**. Since the incoming data rate is the same as outgoing data rate, the present invention generates multiple phases of clocks from the clock signal on line **214**. Using these clocks, the signal line **212** is sampled multiple times per data period to locate a data transition. Once the transition is detected, it is used as the data boundary.

As shown in FIG. **6A**, the first embodiment of the decoder **202a** preferably comprises a delay-locked loop **602**, a sampling unit **604**, a data generator and a transition detector **608**. The delay-locked loop **602** has an input coupled to receive the clock signal on line **214**. The same delay-locked loop could be used in both the clock generator **200** and the decoder **202**. The delay-locked loop **602** is of a conventional type and provides a plurality of phase shift clock signals. Outputs of the delay-locked loop **602** are coupled to respective inputs of the, sampling unit **604**. The sampling unit **604** includes control logic for generating a signal on a first output that controls when the transition detector **608** samples and latches the signal on line **212**. For example, the sampling unit **604** can generate this control signal for every rising edge seen at the input from the delay-locked loop **602**. The first output is coupled to an input of the transition detector **608**. The sampling unit **604** also provides a time signal on a second output indicating the signals from the delay-locked loop **602** that have transitioned, and thus, the time within the clock cycle. The second output of the sampling detector **604** is coupled to an input of the data generator **606**. The transition detector **608** has an input coupled to line **212** to receive the signal from the receiver **106**. The transition detector **608** detects transitions in the signals on the line **212**. When a transition is present the transition detector **608** asserts its output. The data generator **606** is coupled to the sampling unit **604** to receive a signal indicating the time within the clock cycle and the transition detector **608** to identify when the transition occurs. Using this information, the data generator **606** outputs the bit values corresponding to when the transitions occur. For example if the transition is before the time for a falling edge of the clock if it had a 50% duty cycle then the data generator **606** may output a 1

if after the data generator **606** could output a 0 if the data rate were one bit per clock cycle. Those skilled in the art will recognize how the data generator **606** could be modified according to the number of bits per clock cycle transmitted by the receiver **106**. The output of the data generator **606** is provided on line **218** for use by the transmitter **102**.

FIG. **6B** shows an alternate embodiment for the decoder **202a**. When receiver **106** sends data in return to zero (RZ) manner, the rising edge of the incoming clock is preferably used as the data reference point, and a phase in the middle of those consecutive rising edges is generated and used to sample the incoming data at that point. Thus, the decoder **202a** comprises merely a delay-locked loop **650** and a flip-flop **620**. The delay-locked loop **650** preferably provides a signal that has a rising edge in about the middle of the clock cycle such as ϕ_3 . This signal is coupled to the clock input of the flip-flop **620** to cause the flip-flop **620** to latch near the middle of the clock cycle. The data input of the flip-flop **620** is coupled to line **212** to receive the data signal sent by the receiver **106** and the D output of the flip-flop **620** provides the data output and is coupled to line **218**.

Those skilled in the art will recognize that the decoder **202** may alternatively be formed as an integrator type receiver where the period of the clock is subdivided and the integrator integrates over the subdivided time periods and compares the integration results. The signal is effectively integrated and dumped for comparison to determine the data values. Receiver

FIG. **7** shows a preferred embodiment for the receiver **106** constructed in accordance with the present invention. The receiver **106** preferably comprises a line interface **706**, a clock re-generator **700**, a data decoder **702**, a delay compensator **708** and a return channel encoder **704**.

The line interface **706** is preferably identical to that described above with reference to FIGS. **5A** and **5B**. However, for the receiver **106**, the line interface **706** is completely optional and the receiver **106** can operate without it. The line interface **706** buffers the signals and filters them for better use in recovery. The line interface **706** has an input, an output and a bi-directional port. The bi-directional port is coupled to the clock transmission line **104**. The input of the line interface **706** is coupled to line **720** to receive the output of the return channel encoder **704**. The output of the line interface **706** is coupled to line **722** to provide input signals to the clock re-generator **700** and the data decoder **702**. For ease of understanding reference numerals for the line interface **706** have been added to FIG. **5A**.

The clock re-generator **700** has an input and an output. The input of the clock re-generator **700** is coupled to receive the signals on the clock transmission line **104** via line **722** from the line interface **706**. The clock re-generator **700** monitors the transmission line **104**, receives signals, filters them and generates a clock signal at the receiver **106**. The output of the clock re-generator **700** is coupled to line **710** and provides the clock signal for the receiver **106** to use in recovering data from the data channels **108**. The clock re-generator **700** advantageously only uses the rising edges of the signals on the transmission line **104** to regenerate the clock signal at the receiver **106**. This allows the falling edge position and voltage level to be used for other data transfer. The preferred embodiment for the clock re-generator **700** is simply an amplifier that can provide an amplified version of the signal to other digital logic receiving the clock. Referring now also to FIG. **8**, another embodiment for the clock re-generator **700** is shown. In FIG. **8**, the clock re-generator **700** is a phase-locked loop **800** that has an input that is coupled to the transmission line **104** and an output that

provides the clock as a square wave. The phase-locked loop **800** is a conventional type and includes a phase detector **802**, an amplifier and filter **804** and a voltage controlled oscillator **806**. These components **802**, **804**, **806** are coupled in a conventional manner with the input of the phase detector **802** coupled to line **104** and the output of the voltage controlled oscillator providing the clock signal and being feed back to the phase detector **802**. Those skilled in the art will recognize that various other embodiments of phase-locked loops could be used for the clock re-generator **700** since it is only necessary to detect the rising edges on the transmission line **104** and produce a clock signal therefrom. Alternate embodiments for the clock re-generator **700** could also use a delay-locked loop.

The data decoder **702**, like the clock re-generator **700**, has an input coupled to receive the signals on the transmission line **104** via line **722** from the line interface **706**. The data decoder **702** filters and decodes the signals to produce data signals that are output on line **712**. The data decoder **702** also has another input coupled to line **710** to receive the recovered clock signal from the clock re-generator **700**. This is preferably done by determining the position of the falling edge of the clock signal and translating the falling edge position into bit values. The data being sent from the transmitter **102** to the receiver **106** is valid on the falling edge of the clock. Referring also now to FIG. **9**, a preferred embodiment for the data decoder **702** will be discussed. The preferred embodiment of the data decoder **702** is very similar to the second embodiment of the decoder **202b** of the transmitter **102**. The data decoder **702** differs only in its coupling to other components which is shown in FIG. **9**. The data decoder **702** includes a delay-locked loop **650** and a flip-flop **620**. The clock input of the delay-locked loop **650** is coupled to line **710** to receive the regenerated clock signal. The data input to the flip-flop **620** is coupled to line **722** to receive the filter data signals from the transmission line **104**. The output of the flip-flop **620** provides the data output and is coupled to line **712**. The operation is the same as has been described above with reference to FIG. **6B**.

The delay compensator **708** is coupled to line **710** to receive the recovered clock signal. The delay compensator **708** adjusts the recovered clock signal to compensate for propagation delay over the transmission line **104** and propagation delay in recovering the clock such that the signal used to time the sending of data back to the transmitter **102** will have timing that matches the original clock signal on the transmitter side of the clock transmission line **104**. The output of the delay compensator **708** provides an adjusted clock signal and is used by the return channel encoder **704**. In a preferred embodiment, the delay compensator **708** is a phase-locked loop with a delay circuit in the feedback loop between the voltage-controlled oscillator and the phase detector, as will be understood to those skilled in the art. Such a configuration provides negative delay so that the clock signal for return channel signals is moved ahead so that with propagation delay it will matches the timing of the CGOut signal at the transmitter **102**.

The return channel encoder **704** generates signals and asserts them on the transmission line **104** via line **720** and the line interface **706**. The return channel encoder **704** has a data input coupled to line **714** to receive the control and data signals for the data to be sent on the return channel. The return channel encoder **704** also has a clock input coupled by line **724** to the output of the delay compensator **708** to receive a modified clock signal for timing the assertion of data and change in data states. These signals are asserted or superimposed over the clock & data signals provided by the

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transmitter **102**. The return channel encoder **704** advantageously sends data back to the transmitter **106** on the falling edge of the clock thereby preventing the return channel **704** from causing any jitter on the clock signal. More specifically, the return channel encoder **704** minimizes transition activity only around the rising edge of the clock, and minimizes activity by fixing the polarity around the rising edge. This is accomplished by including a delay-locked loop in the return channel encoder **704**. The return channel encoder **704** advantageously places data on the transmission line **104** or clock pair in the form of voltage signal and not edge position, thus reducing any interference and effect on the transmission of the clock and data signals by the transmitter **102**.

Referring now to FIG. **10A**, a first embodiment of the return channel encoder **704a** is shown. The first embodiment return channel encoder **704a** provides the minimum functionality for transmission. For example, the return channel encoder **704a** could be a 1-bit link. This has a low data rate and does not allow DC balancing, however it is advantageous because there is no latency (once the data is at the transmitter there is no latency due to decoding) in getting the data and it is simple to implement. The first embodiment of the return channel encoder **704a** includes a rising edge detector **1002**, a delay circuit **1004** and a latch **1008**. The rising edge detector **1002** has an input coupled to line **724** to receive a signal for timing the changing of the data output. The rising edge detector **1002** detects the rising edge and then asserts its output upon receiving rising edge. The output of the rising edge detector **1002** is coupled to the input of a delay circuit **1004**. The delay circuit delays the signal output of the rising edge detector **1002**, such as by half the clock period. Thus, the output of the delay circuit **1004** is at a time of an ideal falling edge if the clock were to have a 50% duty cycle. The output of the delay circuit **1004** is used to control or latch the latch **1008**. Thus, the data will only change state on an ideal falling edge of the input timing signal on line **724**. The latch **1008** also has a data input and a data output. The data input is coupled to line **714** to receive the data, and the data output is coupled to line **720** for assertion by the line interface **706**. Those skilled in the art will understand how to construct other return channel encoders such as when more than one bit is sent back to the transmitter **102** per clock cycle.

Furthermore, those skilled in the art will realize that the rising edge detector **1002** and the delay circuit **1004** may be replaced by a delay-locked loop or a phase-locked loop as will now be discussed with reference to FIG. **10B**. Referring now to FIG. **10B**, a second embodiment of the return channel encoder **704b** is shown. The second embodiment of the return channel encoder **704b** includes a delayed locked loop **650** and a flip-flop **620**. This is identical in operation to FIG. **6B**, and its operation has been described above. The input to the delayed locked loop **650** is coupled to line **724** and the data input of the flip-flop **620** is coupled to line **714**. The data output of the flip-flop **620** provides the data output on line **720**.

It should be understood that the either embodiment of the return channel encoder **704a**, **704b** could also include an encoder for providing encoding of the data before transmission over the return channel. The addition of an encoder such as a 4 bit/5 bit encoder or a 9 bit/10 bit encoder is advantageous because it increases the amount of data that can be sent per clock cycle. It also provides DC balancing and transition control. However, it makes the transmitter and receiver designs more complicated and adds latency to the availability of the data.

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Referring now to FIGS. **11A**, **11B**, **12A**, and **12B**, timing diagrams for the key signals of the present invention are shown. The timing diagram includes: 1) the CGOut signal on line **210** which is asserted on the clock transmission line **104**; 2) the signal on the clock transmission line **104**; 3) the re-generated clock signal on line **710**; 4) the recovered data signal on line **712**; and 5) the return channel signal asserted by the return channel encoder **704** on the clock transmission line **104**. FIG. **11A** illustrates the signals at the transmitter **102** using a return to zero signaling method. Similarly, FIG. **11B** illustrates signals on the transmission line, and signal in the receiver **106** using a return to zero signaling method. In contrast, FIGS. **12A** and **12B** show the signal relationships for a non-return to zero signaling method. FIG. **12A** shows the signals at the transmitter **102** and FIG. **12B** shows the signals at the receiver **106**.

These timing diagrams demonstrate a number of features of the combined clock and bi-directional data link of the present invention. First, that transition activity and polarity activity by either the transmitter **102** or the receiver **106** is minimized or eliminated close to the rising edge of the CGOut signal. Second, the transmission of data from the transmitter **102** to the receiver **106** is through the position of the falling edge of the clock signal. Third, the transmission of data from the receiver **106** to the transmitter **102** is by current or voltage level adjustment and any changes are not made near the rising edge of the clock signal from the transmitter **102**. Fourth, the effect of assertion of data signals by the receiver **106** does not impact the edges in the signals from the transmitter **102**.

Clock Multiplication

One important advantage of the present invention is that no modification to any portions of the present invention is necessary for the invention to be operable with or without clock multiplication. In some cases, the transmitter **102** and the receiver **106** have the ability to increase the data transmission rate by increasing the clock rate through clock multiplication (sending multiple clock signals within one period of the clock signal). In such a case, the transmitter **102** asks the receiver **106** if it can handle clock multiplication. The receiver **106** indicates to the transmitter **102** what if any levels of clock multiplication can be handled. The transmitter then sends on the highest clock multiplication level possible. In clock multiplication, the transmitter **106** just sends a multiplied clock, however, the receiver **106** has to divide that multiplied clock down to the original pixel clock so that the main data channel can make use of the clock. The phase information on the clock is also important in some data links and it can also be conveyed through the data link provided with the present invention. In the transmitter **102**, a DLL/PLL is used to multiply the clock at the integer multiple of the incoming clock. For some transmission lines, since the jitter information is important, only integer multiple is allowed. However, if this is not that important, rational number multiples can also be used to save the bandwidth.

It is to be understood that the specific mechanisms and techniques that have been described are merely illustrative of one application of the principles of the invention. Numerous additional modifications may be made to the apparatus described above without departing from the true spirit of the invention.

What is claimed is:

1. An apparatus for transmitting a clock signal and data signals over a signal line, the apparatus comprising a clock generator having a first input, a second input and an output, the clock generator modulating a falling edge of an output

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signal to indicate different data values, the first input of the clock generator coupled to receive a clock signal, and the second input of the clock generator coupled to receive a control signal indicating a data value to be transmitted.

2. The apparatus of claim 1, further comprising a data decoder for extracting data signals, the data decoder having an input and an output, the data decoder for extracting data signals, the input of the data decoder coupled to the signal line, the output providing data from the signal line.

3. The apparatus of claim 2, further comprising a line interface for asserting signals on and extracting signals from the signal line, the line interface having an input, an output and a bi-directional port, the bi-directional port coupled to the signal line, the input of the line interface coupled to the output of the clock generator, the output of the line interface coupled to the input of the decoder.

4. The apparatus of claim 3, wherein the line interface further comprises a first amplifier coupling the output of the clock generator to the signal line, a differential amplifier having a first input coupled to the signal line, a second amplifier coupling the clock generator to a second input of the differential amplifier, and the output of the differential amplifier providing the output of the line interface.

5. The apparatus of claim 1, wherein the clock generator further comprises:

a delay-locked loop having an input and a plurality of outputs for outputting signals shifted in phase from an input signal, the input of the delay-locked loop coupled to receive the clock signal;

a multiplexer having a plurality of inputs and an output for selecting one of the plurality of input signals for output, the plurality of inputs of the multiplexer coupled to respective outputs of the delay-locked loop; and

a latch having a first input and a second input, the first input coupled to an output of the delay-locked loop, and the second input coupled to output of the multiplexer.

6. The apparatus of claim 5, further comprising a monostable multivibrator having an input and an output, the input of the monostable multivibrator adapted to receive the clock signal, the output of the monostable multivibrator coupled to the input of the delay locked loop.

7. The apparatus of claim 5, wherein the latch further comprises a pair of cross-coupled NAND gates.

8. The apparatus of claim 2, wherein the decoder further comprises

a delay-locked loop having an input and a plurality of outputs for outputting signals shifted in phase from an input signal, the input of the delay-locked loop coupled to receive the clock signal;

a sampling unit having a plurality of inputs, a first output and a second output, the sampling unit for controlling when signals are sampled and for indicating the time at which signals are sampled, the plurality of inputs coupled to respective outputs of the delay-locked loop;

a transition detector for determining when there is a transition in a signal, the transition detector having a data input, a control input and a data output, the data input of the transition detector coupled to the signal line, the control input of the transition detector coupled to the first output of the sampling unit; and

a data generator having a first input, a second input and an output, data generator for producing bit values corresponding to when transitions occur on the signal line, the first input of the data generator coupled to the second output of the sampling unit, the second input of the data generator coupled to the output of the transition detector.

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9. The apparatus of claim 2, wherein the decoder further comprises

a delay-locked loop having an input and a plurality of outputs for outputting signals shifted in phase from an input signal, the input of the delay-locked loop coupled to receive the clock signal;

a flip-flop having an control input, a data input and an output, the control input of flip-flop coupled to one of the plurality of outputs of the delay-locked loop, and the data input of the flip-flop coupled to the signal line.

10. The apparatus of claim 1, wherein the apparatus is coupled by the signal line to a receiver, and wherein the receiver further comprises:

a clock re-generator having an input and an output for recovering a clock signal from the signal line, the input of the clock re-generator coupled to the signal line;

a second decoder for extracting data signals, the second decoder having a first input, a second input and an output, the second decoder for extracting data signals, the first input of the second decoder coupled to the signal line, the second input of the second decoder coupled to the output of the clock re-generator and the output providing data from the signal line.

11. The apparatus of claim 10, wherein the clock re-generator of the receiver is an amplifier.

12. The apparatus of claim 10, wherein the clock re-generator of the receiver is a phase-locked loop.

13. The apparatus of claim 10, wherein the second decoder further comprises

a delay-locked loop having an input and a plurality of outputs for outputting signals shifted in phase from an input signal, the input of the delay-locked loop coupled to output of the clock re-generator;

a sampling unit having a plurality of inputs, a first output and a second output, the sampling unit for controlling when signals are sampled and for indicating the time at which signals are sampled, the plurality of inputs coupled to respective outputs of the delay-locked loop;

a transition detector for determining when there is a transition in a signal, the transition detector having a data input, a control input and a data output, the data input of the transition detector coupled to the signal line, the control input of the transition detector coupled to the first output of the sampling unit; and

a data generator having a first input, a second input and an output, data generator for producing bit values corresponding to when transitions occur on the signal line, the first input of the data generator coupled to the second output of the sampling unit, the second input of the data generator coupled to the output of the transition detector.

14. The apparatus of claim 10, wherein the second decoder further comprises

a delay-locked loop having an input and a plurality of outputs for outputting signals shifted in phase from an input signal, the input of the delay-locked loop coupled to the output of the clock re-generator; and

a flip-flop having a control input, a data input and an output, the control input of flip-flop coupled to one of the plurality of outputs of the delay-locked loop, and the data input of the flip-flop coupled to the signal line.

15. The apparatus of claim 10, further comprising a second line interface for asserting signals on and extracting signals from the signal line, the second line interface having an input, an output and a bi-directional port, the

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bi-directional port coupled to the signal line, the output of the line interface coupled to the input of the second decoder and the clock re-generator.

16. The apparatus of claim 10, further comprising a delay compensator having an input and an output for adjusting a recovered clock signal to compensate. for propagation delay, the input of the delay compensator coupled to the output of the clock re-generator.

17. The apparatus of claim 16, further comprising a return channel encoder having a first input, a second input and an output, for sending signals on the signal line, the first input of the return channel encoder coupled to receive data for transmission, the second input of the return channel encoder coupled to the output of the delay compensator, and the output of the return channel encoder coupled to the signal line.

18. The apparatus of claim 17, wherein the return channel encoder further comprises:

a delay-locked loop having an input and a plurality of outputs for outputting signals shifted in phase from an input signal, the input of the delay-locked loop coupled to the output of the delay compensator; and

a flip-flop having a control input, a data input and an output, the control input of flip-flop coupled to one of the plurality of outputs of the delay-locked loop, and the data input of the flip-flop coupled to the signal line.

19. A receiver for coupling to a transmitter through a signal line, wherein the receiver comprises:

a clock re-generator for recovering a clock signal from the signal line, the clock re-generator having an input and an output, the input of the clock re-generator coupled to the signal line; and

a data decoder for extracting data signals from the clock signal, the decoder having a first input, a second input, and an output, the first input of the decoder coupled to the signal line, the second input of the second decoder coupled to the output of the clock re-generator and the output providing data from the signal line, the data decoder comprising:

a delay-locked loop having an input and a plurality of outputs for outputting signals shifted in phase from an input signal, the input of the delay-locked loop coupled to the output of the clock re-generator; and

a flip-flop having a control input, a data input, and an output, the control input of the flip-flop coupled to one of the plurality of outputs of the delay-locked loop, the data input of the flip-flop coupled to the signal line, and the output providing data from the signal line.

20. The receiver of claim 19, further comprising a line interface for asserting signals on and extracting signals from the signal line, the line interface having an input, an output and a bi-directional port, the bi-directional port coupled to the signal line, the output of the line interface coupled to the input of the decoder and the clock re-generator.

21. The receiver of claim 20, further comprising a delay compensator having an input and an output for adjusting a recovered clock signal to compensate for propagation delay, the input of the delay compensator coupled to the output of the clock re-generator.

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22. The receiver of claim 21, further comprising a return channel encoder having a first input, a second input and an output, for sending signals on the signal line, the first input of the return channel encoder coupled to receive data for transmission, the second input of the return channel encoder coupled to the output of the delay compensator, and the output of the return channel encoder coupled to the signal line.

23. The receiver of claim 22, wherein the return channel encoder further comprises:

a rising edge detector having an input and an output, the input coupled to the output of the delay compensator;

a delay circuit having an input and an output, the input coupled to the output of the rising edge detector; and

a latch having a control input, a data input and a data output, the control input coupled to the output of the delay circuit, the data input adapted to receive data, and the data output coupled to the input of the line interface.

24. The receiver of claim 22, wherein the return channel encoder further comprises:

a delay-locked loop having an input and a plurality of outputs for outputting signals shifted in phase from an input signal, the input of the delay-locked loop coupled to the output of the delay compensator; and

a flip-flop having a control input, a data input and an output, the control input of the flip-flop coupled to one of the plurality of outputs of the delay-locked loop, and the data input of the flip-flop coupled to the signal line.

25. A method for receiving and transmitting signals using a receiver coupled to a signal line, the method comprising: receiving a signal on an input of a clock re-generator, the clock re-generator having an input and an output, the clock re-generator being adapted for recovering a clock signal from the signal line;

receiving a signal on a data input of a data decoder, the data decoder having a control input, a data input, and a data output, the data decoder adapted for extracting data from the signal on the data input;

passing the clock signal from the output of the clock re-generator to the control input of the data decoder;

passing the clock signal from the output of the clock re-generator to the input of a delay compensator, the delay compensator having an input and an output, the delay compensator adapted for adjusting a clock signal from a clock re-generator to compensate for propagation delay; and

transmitting data from a data output of a return channel encoder over the signal line, the return channel encoder having a control input, a data input, and a data output, the control input coupled to receive the output from the delay compensator and the data input being adapted to receive data.

26. The method of claim 25, wherein prior to receiving a signal on an input of a clock re-generator, the method further comprises:

receiving a signal on an input of a line interface, the line interface having an input coupled to the signal line and an output.

* * * * *

EXHIBIT C

(12) **United States Patent**
Kim et al.

(10) **Patent No.:** **US 7,158,593 B2**
(45) **Date of Patent:** **Jan. 2, 2007**

(54) **COMBINING A CLOCK SIGNAL AND A DATA SIGNAL**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 736 days.

(21) Appl. No.: **10/099,533**

(22) Filed: **Mar. 15, 2002**

(65) **Prior Publication Data**

US 2002/0181608 A1 Dec. 5, 2002

Related U.S. Application Data

(60) Provisional application No. 60/276,672, filed on Mar. 16, 2001.

(51) **Int. Cl.**
H04L 7/00 (2006.01)

(52) **U.S. Cl.** **375/354**

(58) **Field of Classification Search** 375/238,
375/239, 219-220, 257, 259, 377; 327/35,
327/36, 170, 175, 291, 299; 370/503, 509,
370/510, 512, 535

See application file for complete search history.

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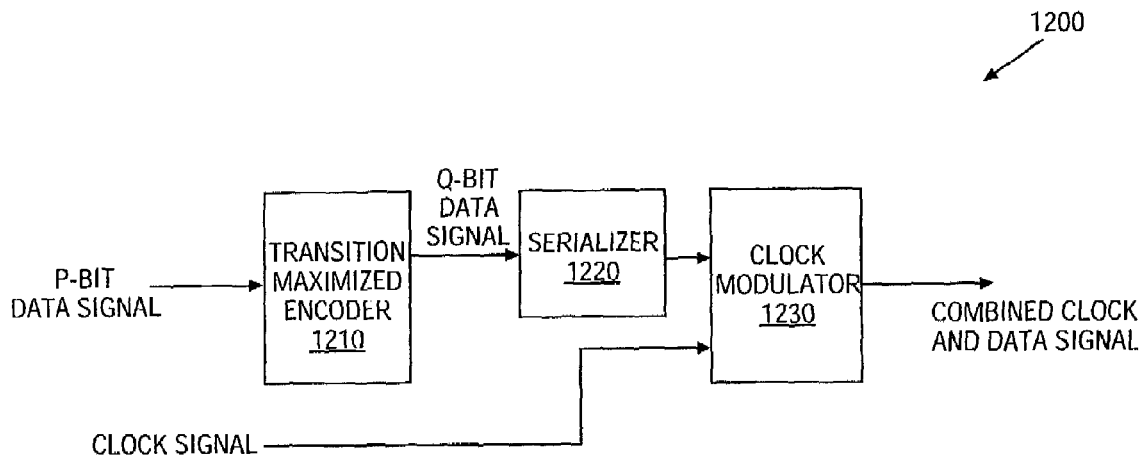
Primary Examiner—Khanh Tran

(74) *Attorney, Agent, or Firm*—Perkins Coie LLP

(57) **ABSTRACT**

A method of transmitting data in a system including at least one data channel and a separate clock channel is disclosed. The method involves combining a clock signal to be transmitted on the clock channel with a data signal to generate a combined clock and data signal. In one embodiment, the data signal has been generated from data words using an encoding scheme that shifts an energy spectrum of the data signal away from an energy spectrum of the clock signal. In another embodiment, the clock signal has a plurality of pulses each having a front edge and a back edge, and the data signal is modulated onto the clock signal by moving at least one edge (i.e. front or back or both) of the plurality of pulses, thereby to create a combined clock and data signal.

35 Claims, 8 Drawing Sheets



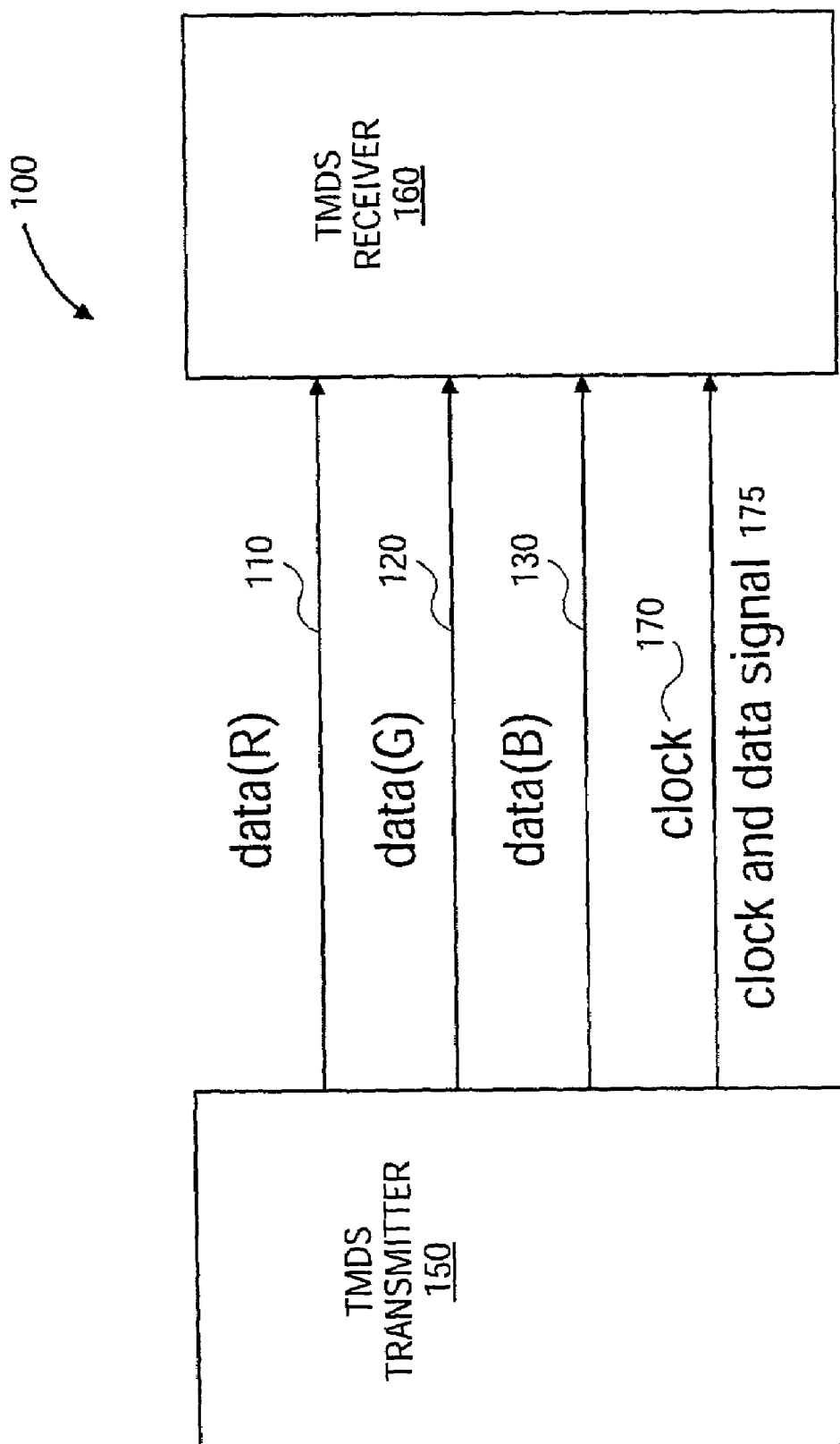


FIG. 1

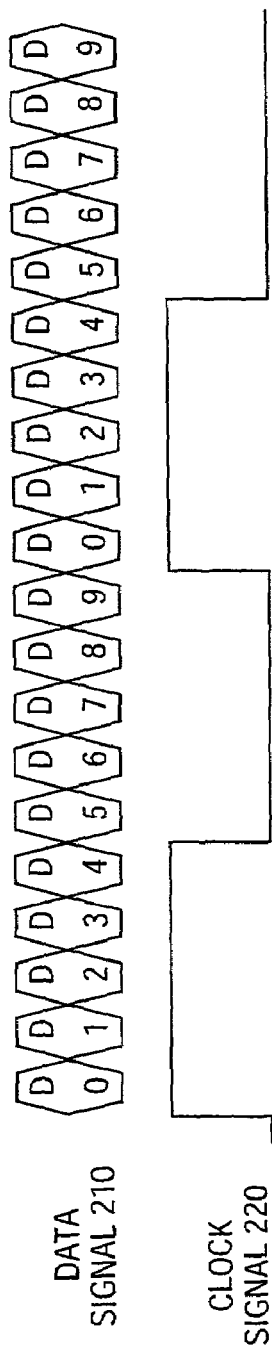


FIG. 2

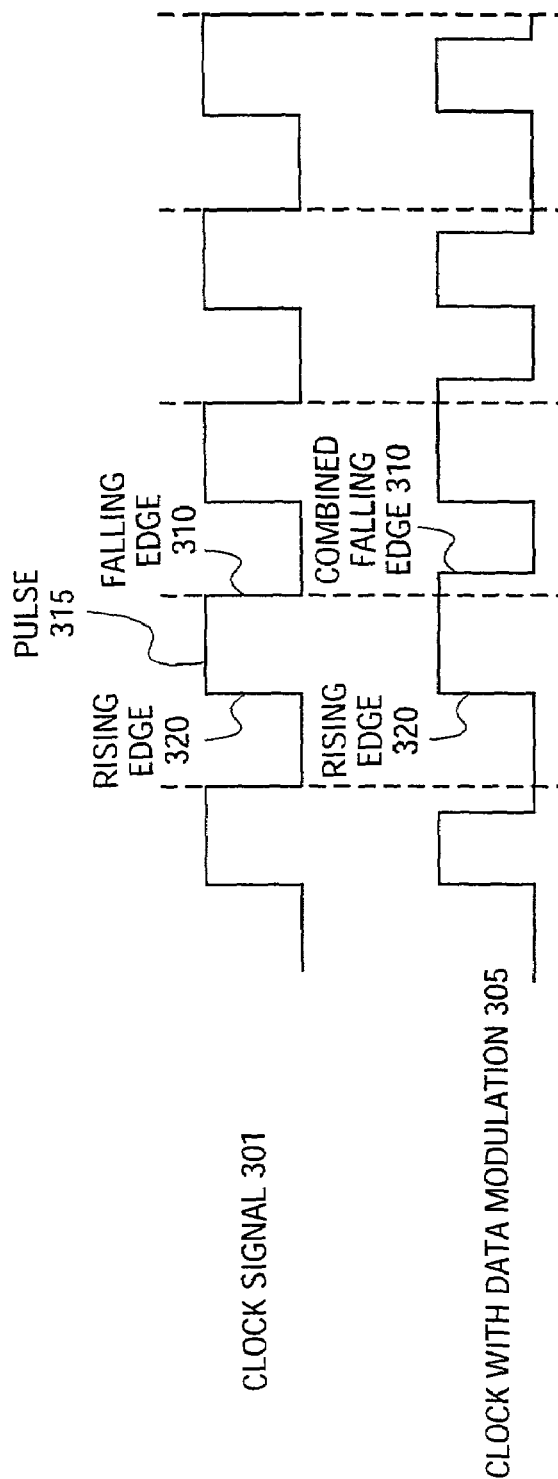


FIG. 3

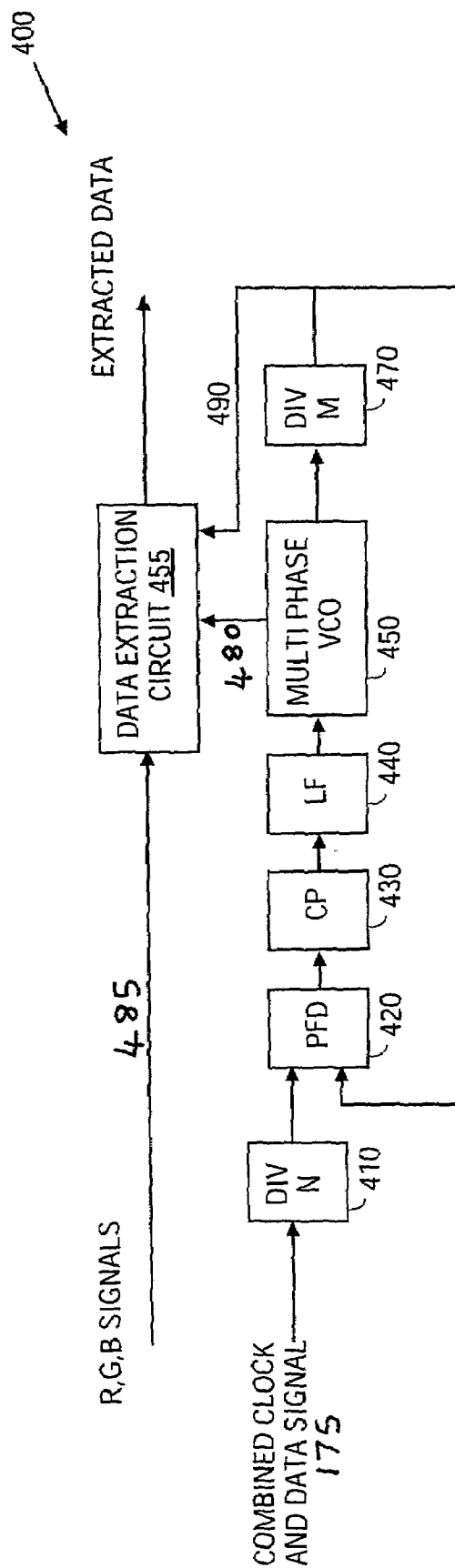


FIG. 4

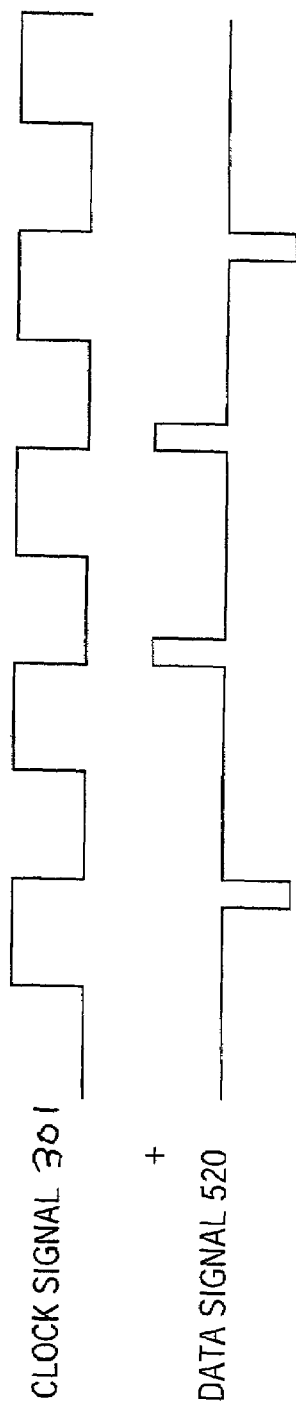


FIG. 5

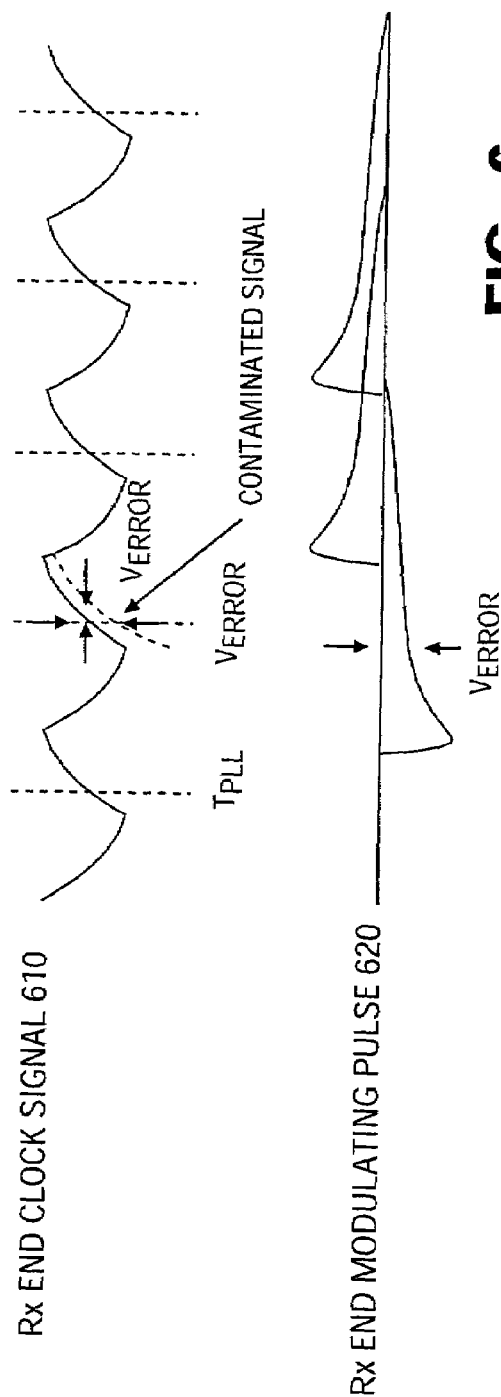


FIG. 6

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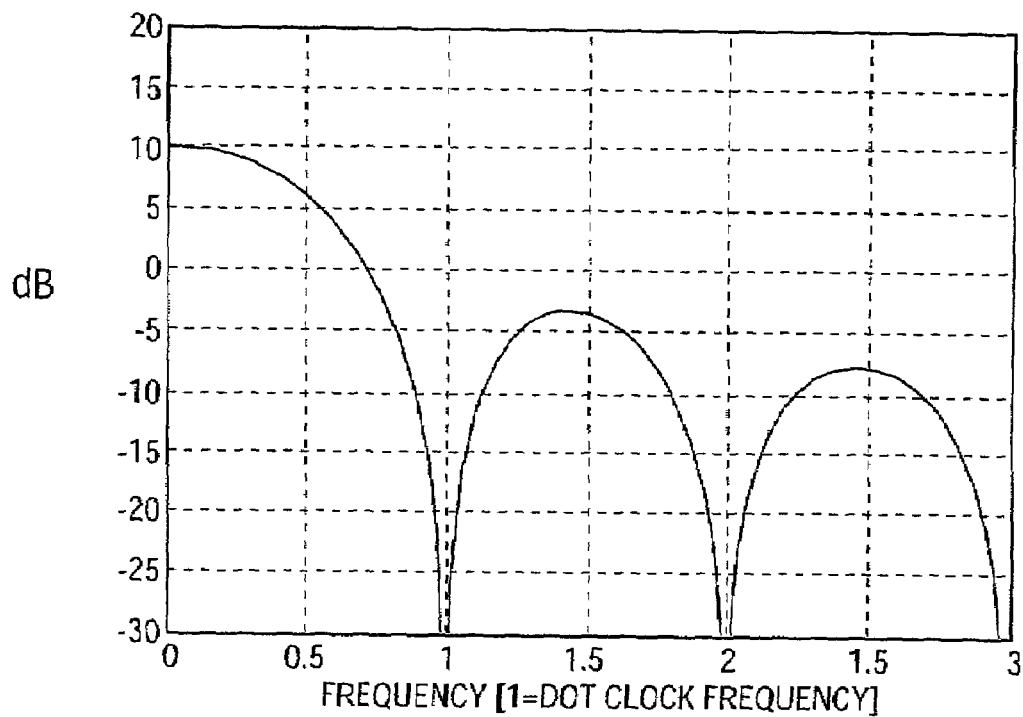


FIG. 7

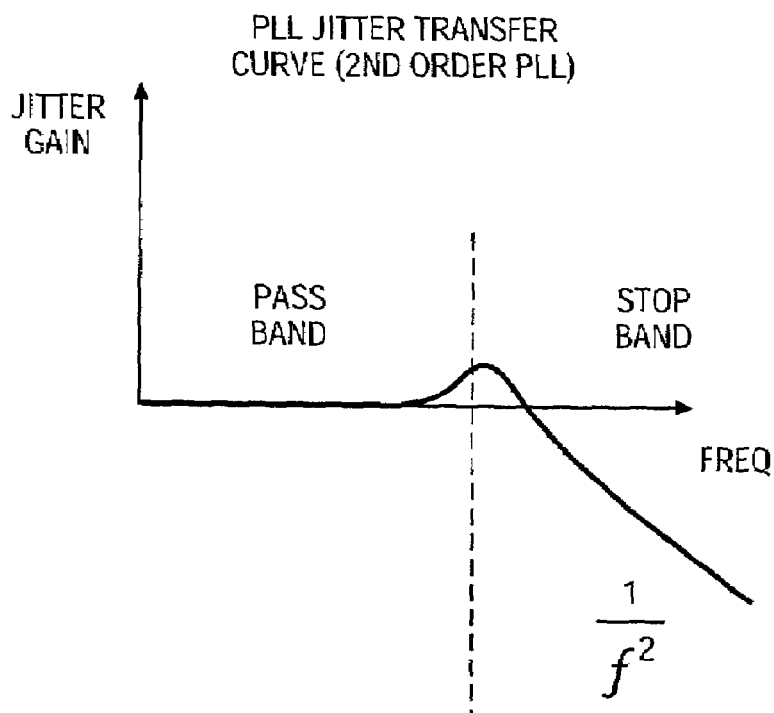


FIG. 8

PLL LOOP BW

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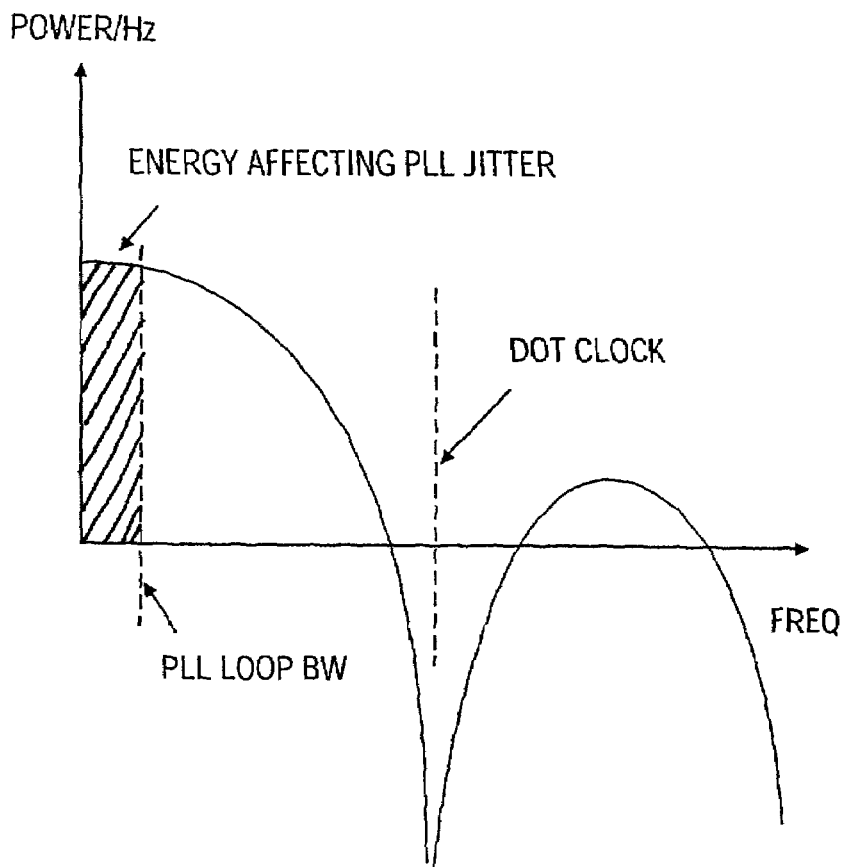


FIG. 9

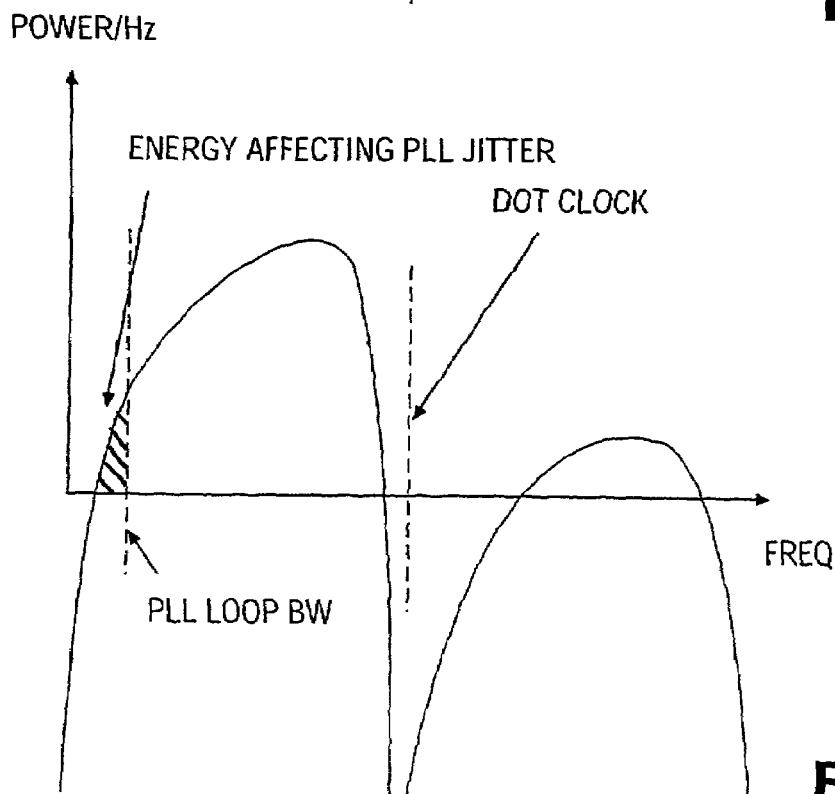
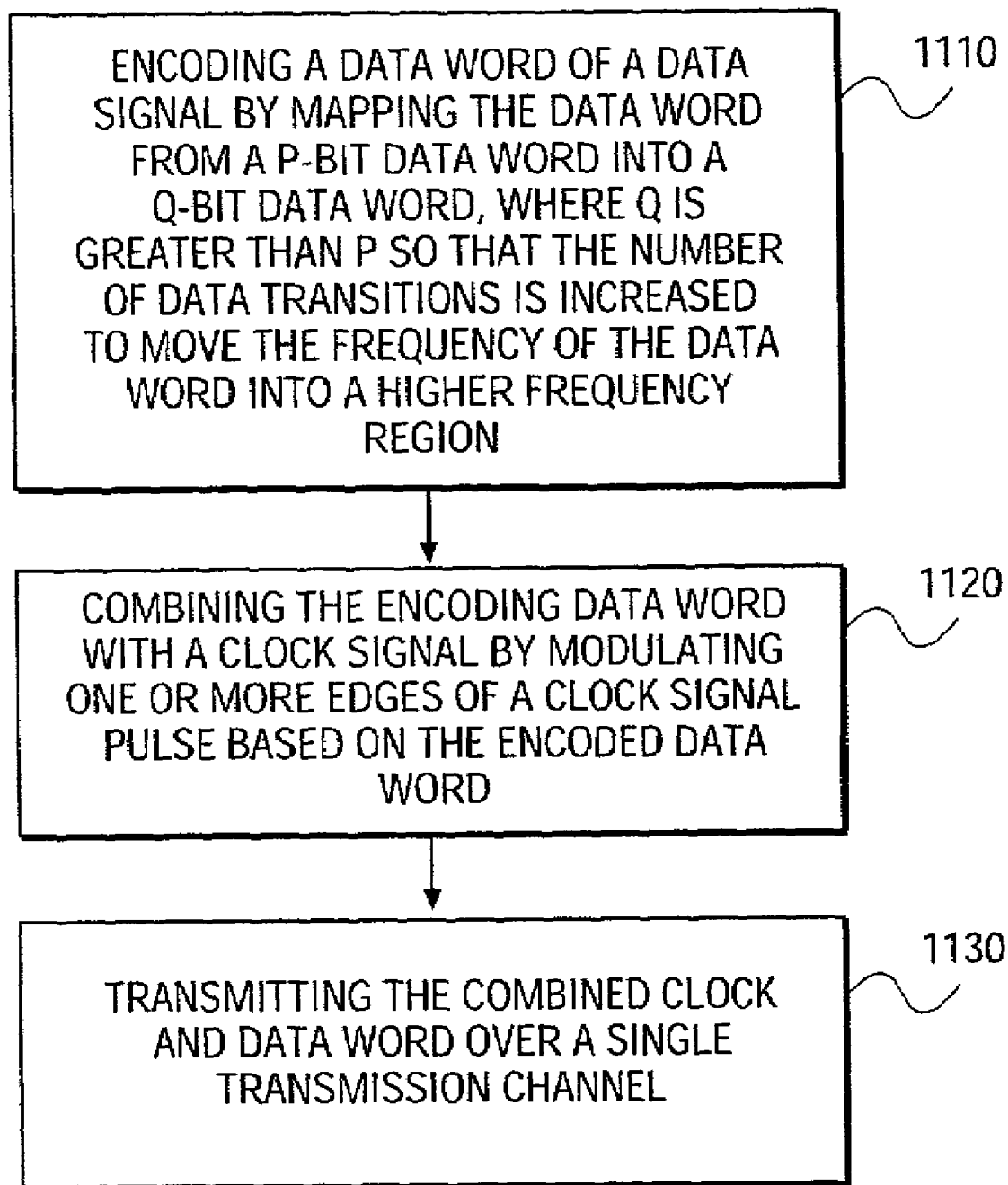


FIG. 10

**FIG. 11**

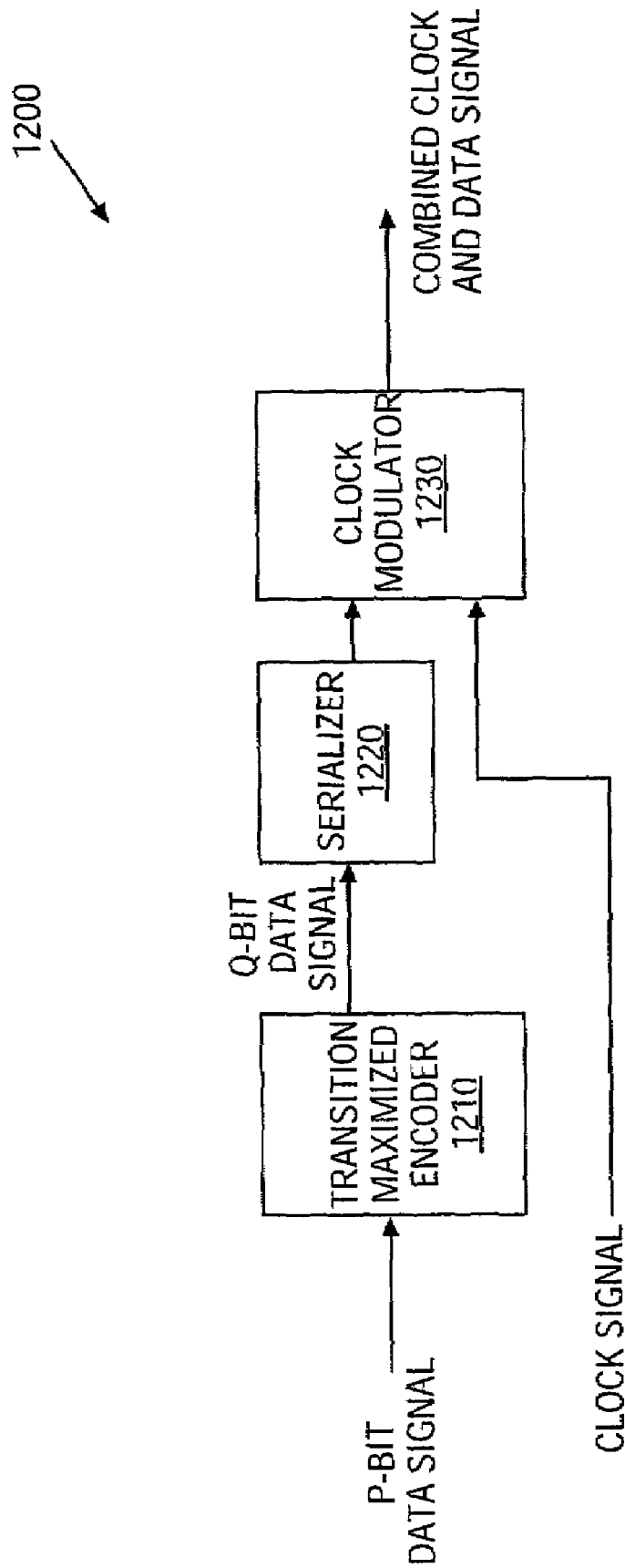


FIG. 12

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**COMBINING A CLOCK SIGNAL AND A
DATA SIGNAL****CROSS-REFERENCE TO RELATED
APPLICATIONS**

This application claims priority under 35 U.S.C. § 120 from co-pending U.S. application Ser. No. 09/393,235, filed on Sep. 9, 1999 by Gyudong Kim, Minkyu Kim, and Seung Ho Hwang, entitled "A System And Method For Sending And Receiving Data Signals Over A Clock Signal Line," which is fully incorporated into this application by reference; and this application claims priority from and the benefit of U.S. Provisional Patent Application No. 60/276,672, filed on Mar. 16, 2001, entitled "Encoding Scheme for a Phase Modulated Clock Signal," which is fully incorporated into this application by reference.

BACKGROUND OF THE INVENTION**1. Field of the Invention**

The present invention relates to transmitting clock and data signals.

2. Description of the Background Art

The digital visual interface DVI 1.0 Specification, Digital Display Working Group [online], Apr. 2, 1999 [retrieved Mar. 15, 2001], retrieved from the Internet:<URL:http://www.ddwg.org>, which is fully incorporated herein by reference, attempts to address the computer industry's requirements for a digital connectivity specification for high-performance personal computers (PCs) and digital displays.

In synchronous high-speed transmission systems that process digital signals, a clock signal and one or more data signals are transmitted over separate wires. For example, the system transmits data signals over data channels, and transmits a clock signal over a clock channel. These separate channels that transmit only a data signal or only a clock signal permit high performance digital data to be transmitted using a system that has a very simple architecture.

However, because only the clock signal is transmitted over the clock channel, additional signals, such as data signals for example, cannot be transmitted over the clock channel using this system. Therefore, this system does not transmit both a data signal and the clock signal over the clock channel.

SUMMARY OF THE INVENTION

A method and an apparatus to combine a clock signal and a data signal, and to transmit the combined signal over one cable, are disclosed.

According to one aspect of the invention, provided is a method of transmitting data in a system including at least one data channel and a separate clock channel, the clock channel being used to decode data transmitted on the at least one data channel, comprising:

combining a clock signal to be transmitted on the clock channel with a data signal having a plurality of data words, to generate a combined clock and data signal, and transmitting the combined clock and data signal on the clock channel;

wherein the data signal has been generated from the data words using an encoding scheme that shifts an energy spectrum of the combined clock and data signal away from an effective loop bandwidth of a clock recovery block.

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According to another aspect of the invention, the encoding scheme maps the data word from a p-bit data word into a q-bit data word, where $q > p$.

According to another aspect of the invention, the encoding scheme is direct current (DC) balanced to minimize a DC component of the combined signal.

According to another aspect of the invention, the clock signal has a plurality of pulses, each pulse of the plurality of pulses having a front edge and a back edge, and wherein the combining step comprises:

modulating the data signal onto the clock signal by moving the front or back edges of the plurality of pulses.

According to a further aspect of the invention, the clock signal has a plurality of pulses, each pulse of the plurality of pulses having a front edge and a back edge, and wherein the combining step comprises:

modulating the data signal onto the clock signal by moving the front edges of the plurality of pulses.

According to another aspect of the invention, the clock signal has a plurality of pulses, each pulse of the plurality of pulses having a first edge and a second edge, and wherein the combining step comprises:

modulating the data signal onto the clock signal by moving both the front edges and the back edges of the plurality of pulses.

According to a further aspect of the invention, the combining step further comprises:

performing pre-emphasis to the combined signal, so that inter-symbol interference of the combined signal transmitted over a band-limited channel is minimized or reduced.

According to another aspect of the invention, the encoding scheme further comprises:

increasing a number of transitions in each data word. The encoding scheme may also be an encryption scheme.

According to another aspect of the invention, the encoding scheme includes the step of:

encoding an instantaneous data word of said plurality of data words as function of both the instantaneous input word and earlier data words in the data signal.

Further, the encoding scheme may include the step of:

encoding one of the data words of said plurality of data words as a function of one of the following:

future data words; or earlier data words; or future and earlier data words; of said plurality of data words.

According to another aspect of the invention, provided is a method of transmitting data in a system including at least one data channel and a separate clock channel, the clock channel being used to decode data transmitted on the at least one data channel, comprising:

providing a clock signal having a plurality of pulses, each pulse of the plurality of pulses having a front edge and a back edge;

modulating a data signal having a plurality of data words onto the clock signal by moving at least one edge of the plurality of pulses, thereby to create a combined clock and data signal; and

transmitting the combined clock and data signal on the clock channel.

The method may further comprise:

encoding the data words using an encoding scheme that maps the data words from p-bit data words into a q-bit data words, where $q > p$.

The encoding scheme may be direct current (DC) balanced to minimize a DC component of the combined signal.

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According to another aspect of the invention, the modulating step comprises:

modulating the data signal onto the clock signal by moving both of the front and back edges of the plurality of pulses.

The modulating may step comprise:

modulating the data signal onto the clock signal by moving the front edges of the plurality of pulses.

The modulating step may comprise:

modulating the data signal onto the clock signal by moving the back edges of the plurality of pulses.

The method may further comprise:

performing pre-emphasis to the combined signal, so that inter-symbol interference of the combined signal transmitted over a band-limited channel is minimized or reduced.

The method may further comprise:

encoding the data words using an encoding scheme that increasing a number of transitions in each data word, and the encoding scheme may be an encryption scheme.

Alternatively, the encoding scheme may comprise:

encoding an instantaneous data word of said plurality of data words as function of both the instantaneous input word and earlier data words in the data signal.

Alternatively, the encoding scheme may comprise:

encoding one of the data words of said plurality of data words as a function of one of the following: future data words; or earlier data words; or future and earlier data words; of said plurality of data words.

According to yet another aspect of the invention, provided is a system for transmitting data, comprising

a transmitter including at least one data channel and a separate clock channel, the clock channel being used by a receiver to decode data transmitted on the at least one data channel, the transmitter being operative to:

combine a clock signal to be transmitted on the clock channel with a data signal having a plurality of data words, to generate a combined clock and data signal, and transmit the combined clock and data signal on the clock channel;

wherein the data signal has been generated from the data words using an encoding scheme that shifts an energy spectrum of the combined clock and data signal away from an effective loop bandwidth of a clock recovery block.

In the system, the encoding scheme may map the data word from a p-bit data word into a q-bit data word, where $q > p$.

According to another aspect of the invention, the clock signal has a plurality of pulses, each pulse of the plurality of pulses having a front edge and a back edge, and wherein the transmitter combines the clock signal with the data signal by:

modulating the data signal onto the clock signal by moving at least one edge of the plurality of pulses.

According to another aspect of the invention, the modulation may be done by moving the front edges of the plurality of pulses.

According to another aspect of the invention, the modulation may be done by moving both the front edges and the back edges of the plurality of pulses.

According to yet another aspect of the invention, provided is a system for transmitting data, comprising

a transmitter including at least one data channel and a separate clock channel, the clock channel being used by a receiver to decode data transmitted on the at least one data channel, the transmitter being operative to:

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provide a clock signal having a plurality of pulses, each pulse of the plurality of pulses having a front edge and a back edge;

modulate a data signal having a plurality of data words onto the clock signal by moving at least one edge of the plurality of pulses, thereby to create a combined clock and data signal; and

transmit the combined clock and data signal on the clock channel.

The transmitter may further be operative to:

encode the data words using an encoding scheme that maps the data words from p-bit data words into a q-bit data words, where $q > p$.

The transmitter may further be operative to:

modulate the data signal onto the clock signal by moving both of the front and back edges of the plurality of pulses.

Alternatively, the transmitter may further be operative to: modulate the data signal onto the clock signal by moving the front edges of the plurality of pulses.

Alternatively, the transmitter may further be operative to: modulating the data signal onto the clock signal by moving the back edges of the plurality of pulses.

According to a further aspect of the invention, the transmitter uses an encoding scheme for generating the data signal from the data words that shifts an energy spectrum of the combined clock and data signal away from an effective loop bandwidth of a clock recovery block.

Other features and embodiments of the present invention will be illustrated by way of example and not by way of limitation in the accompanying abstract, drawings, and detailed description. The abstract, summary of the invention, drawings, and detailed description are, accordingly, to be regarded in an illustrative rather than restrictive sense and the invention measured only in terms of the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is illustrated by way of example and not by way of limitation in the figures of the accompanying drawings.

FIG. 1 is a block diagram of a transition-minimized differential signaling (TMDS) system that transmits a clock signal and one or more data signals over the clock channel.

FIG. 2 is a timing diagram for data signals and clock signals that are transmitted over the clock channel.

FIG. 3 illustrates a scheme for mixing a data signal into the clock signal in order to transmit the data and clock signals over the clock channel.

FIG. 4 is a block diagram of a portion of a receiver showing a phase locked loop (PLL) used to recover the clock signal from the combined clock and data signal.

FIG. 5 shows individual clock and data components of a combined clock and data signal.

FIG. 6 illustrates the effects of noise on the recovered clock and data signal at the receiving end.

FIG. 7 shows a non-return-to-zero (NRZ) power spectrum of a data signal that is modulated with the clock signal and transmitted over the clock channel.

FIG. 8 shows PLL jitter transfer characteristics for a 2^{nd} order PLL used to recover the clock signal from the combined clock and data signal

FIG. 9 shows the frequency spectrum of the combined clock and data signal after being transformed by the PLL jitter transfer characteristics.

FIG. 10 shows the frequency spectrum jitter noise components in a combined encoded data and clock signal.

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FIG. 11 shows an example of an encoding method.

FIG. 12 shows a block diagram of an apparatus that generates a combined encoded data and clock signal.

DETAILED DESCRIPTION

A method and system to combine a data signal with a clock signal and to transmit the combined signal are disclosed. The combined clock and data signal are transmitted over a clock channel. This increases the amount of bandwidth that is available in the clock channel. In one embodiment, the data signal is encoded, and the encoded data signal is combined with the clock signal. The encoding of the data signal causes some of the energy components of the encoded data signal to move to higher frequencies, so that a low pass filter can attenuate them. The low pass filter can then recover the clock signal from the combined signal, and output the recovered signal to other devices.

An example of a system that combines the clock signal and the data signal is a transition-minimized differential signaling (TMDS) system, which is described in U.S. application Ser. No. 09/393,235, entitled "A System And Method For Sending And Receiving Data Signals Over A Clock Signal Line," became an U.S. Pat. No. 6,463,092 B1, which is fully incorporated into this application by reference.

FIG. 1 shows a block diagram of the TMDS system that can generate and transmit the combined clock and data signal. The combined signal is generated at the transmitting end 150, and the data signal and the clock signal are recovered at the receiving end 160. The combined clock and data signal 175 is transmitted over clock channel 170. Additional data signals are transmitted over data channels 110, 120, and 130.

FIG. 2 shows an example of a data signal 210 that is typically transmitted separately from a clock signal 220 over one of the data channels 110, 120, 130. The clock signal 220 is used by the TMDS receiver 160 to extract the data from the data signal 210. In addition to the data signal(s) 210 transmitted over one or more data channels 110, 120, 130, a further data signal may be combined with the clock signal 220 to generate a combined clock and data signal. The transmitting end 150 as shown in FIG. 1 may generate the combined clock and data signal by multiplexing the further digital data signal and the clock signal. The transmitting end then transmits the multiplexed signal over the clock channel.

Multiplexing a data signal with the clock signal may be performed using a modulation method to modulate one signal onto another signal. For example, as shown in FIGS. 3 and 5, the location of the falling (or trailing) edge 310 of a pulse 315 of the clock signal 301 is modulated, or moved, with respect to the position of the rising edge 320 so that the falling edge 310 of combined clock and data signal 175 is a function of data signal 520, and the rising edge 320 of combined signal 175 is a function of clock signal 301. This combined clock and data signal 175 can then be used to transmit the data signal simultaneously with the clock signal. Alternatively, the position of the rising edge 320 is modulated, or moved, with respect to the falling edge 310 so that the position of the rising edge 320 of the combined clock and data signal 175 is a function of the data signal. Alternatively, both the rising and falling edges of the clock signal 301 are modulated, or moved, relative to their normal positions, so that the positions of both the rising and falling edges of the combined clock and data signal 175 is a function of the data signal. Note that the illustrated data signal 520 is the final component that modulates the clock signal 301. The original data signal, or the data words

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themselves, may typically be more simply represented. That is, the data signal 520 that is shown represents the data signal 520 after any encoding has been done to shift the energy spectrum of the data signal away from the energy spectrum of the clock signal 301.

The receiving end 160, as shown in FIG. 1, may recover the clock signal 301 from the combined signal 175 using a low pass filter, such as phase-locked loop (PLL) that can act as a low pass filter for example. The clock signal component of signal 175 may have a frequency that is well below the bandwidth of the clock transmission channel 170. Also, the data signal component of the combined signal may have a frequency that is significantly higher than the frequency of the clock signal component, and higher than the low pass filter loop bandwidth. At the receiving end 160, the combined signal passes through the low pass filter. The high frequency energy of the data signal is attenuated from the combined signal by the low pass filter. Therefore, the low pass filter can remove the data signal from the combined signal, and output a recovered clock signal.

An embodiment of a block diagram of a PLL low pass filter 400 used by the TMDS system 100 to recover the clock signal and send the recovered clock signal to data recovery components is shown in FIG. 4. Div N block 410 is a divide by N circuit that receives combined clock and data signal 175, divides signal 175 by N, and outputs a divided by N combined clock and data signal. PFD block 420 is a phase frequency detector that detects the frequency of divided by N combined signal. CP block 430 is a charge pump that increases the voltage level of the signal.

Loop filter (LF) block 440 follows block 430, and filters the signal in order to recover the data signal 480 and to recover the clock signal 490 from the combined signal 175. The multi-phase Voltage Controlled Oscillator (VCO) 450 feeds the recovered data signal 480 having a correctly generated frequency to the data extraction circuit 455. Data extraction circuit 455 is a dual-function circuit in the illustrated embodiment, and serves to extract the data both from recovered data signal 480 and from data signals 485 transmitted separately from the combined clock and data signal 175 over data channels 110, 120 and 130, as described above with reference to FIG. 1. Note that data extraction circuit 455 has been shown schematically as a dual function circuit for purposes of illustrating the invention only, and separate functionality is typically provided in two different modules, one for extracting data from the separate data channels and another for extracting data from the combined clock and data channel. This separate functionality usually results from the fact that the data extracting methods may be very different for the separate data channels as compared to the combined clock and data channel. Also, as will be appreciated by someone of ordinary skill in the art, a clock signal at the frequency of the original clock signal 301 is required to extract the data from the combined clock and data signal 175. This can be obtained by providing a separate output after the VCO block 450 block including a block that reverses the division conducted by the DIVN block 410. Alternatively, the data embedded in the combined clock and data signal 175 could be extracted directly by a separate data extraction circuit other than 455, which has an input of the combined clock and data signal 175.

VCO 450 also feeds the recovered clock signal to the divide by M (div M) block 470, where the recovered clock signal is divided by M. Div M block 470 then outputs the recovered clock signal 490 that is at the proper frequency, which is then provided to any device that needs it. For example, the proper frequency of signal 490 may be the

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frequency that is needed by data extraction unit 455 to extract data from the data signals 485 that are received by unit 455.

Thus, using modulation to combine the clock signal with the data signal allows the system 100 to transmit the combined signal 175 over clock channel 170. The modulation also allows the system 100 to recover the clock signal from the combined signal by using the low pass filter to attenuate the noise from the data signal component of the combined signal.

An example of the noise generated by combining the clock signal and the data signal is shown in FIG. 3. Modulating the clock signal 301 to include data signal 520 adds intentional jitter to the falling edge 310 of combined signal 175 in order to allow the transmission of both data and clock information over the same channel, or line. The combined signal 175, including the jitter in falling edges 310, is processed at the receiving end 160. At low frequencies, the jitter may only affect the unused, e.g., falling, edge of the combined signal.

The combined signal gives a minimal penalty in the performance of the system at low frequencies, because the PLL uses the rising edges of the incoming combined signal to compare clock phases. Therefore, a benefit of using modulation to combine signals is maintaining the orthogonal property of both the data signal and the clock signal. Also, because the clock signal is transmitted at a significantly lower frequency than the data signals, as shown in FIG. 2, the clock signal is not significantly attenuated in the bandwidth-limited clock channel 170.

However, as the frequency of the combined signal approaches the bandwidth limit of the clock channel, or the length of the clock channel cable increases, the combined signal is attenuated. This attenuation causes errors to the combined signal that is used to recover the clock signal. Therefore, the recovered clock signal that is output from the low pass filter also has errors caused by the attenuation.

Furthermore, at a higher clock frequency, the frequency of the clock signal approaches the frequency of the data signal. As a result, some of the energy components of the data signal are in a frequency region that is below the low pass filter's bandwidth, and are not attenuated by the low pass filter. The data signal's low frequency energy components that are able to pass through the low pass filter cause jitter noise to the combined signal. Therefore, the clock signal recovered by the low pass filter has jitter noise, which causes errors in the recovered clock signal that is output by the PLL. The jitter noise may be caused by inter-symbol interference and signal dispersion, for example.

Inter-symbol interference occurs when the frequency of the signal approaches the frequency of the clock channel bandwidth. At this high frequency, a bit, or symbol, transmitted on the signal is affected by an adjacent bit or symbol. This prevents the symbol from reaching the threshold needed for detection by the receiver.

Signal dispersion also occurs when the frequency of the signal is increased. For example, the digital data bits are represented on the signal as square waves. Each square wave has multiple frequency components. Some frequency components of a square wave travel faster than others, which cause the frequency components to become dispersed at high frequencies. The slower frequency components may affect subsequently transmitted bits, and the faster frequency components may affect previously transmitted bits. For example, the modulated falling edge of the clock signal may affect the rising edge of the clock signal because of this signal dispersion.

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Therefore, the noise from inter-symbol interference and signal dispersion increases the amount of low frequency jitter noise that passes through the low pass filter, such as a PLL for example, along with the clock signal, and results in a noisy recovered clock signal. For example the effects of the noise caused by inter-symbol interference and signal dispersion at higher frequencies is shown with reference to FIGS. 5 and 6. The combined clock and data signal 175 may be represented as the superposition of clock signal 301 and data signal 520, as shown in FIG. 5.

When the combined signal is transmitted over the clock line at a frequency that approaches the limit of the clock channel's bandwidth, noise such as inter-symbol interference and signal dispersion cause the recovered clock and data signals to have errors. For example, FIG. 6 shows the recovered clock signal 610 and the recovered data signal 620 that both have errors produced by the noise that can pass through the low pass filter. Therefore, the recovered clock signal that is output from the PLL has an increased bit error rate (BER).

For example, the rising edge of the recovered clock signal is contaminated by V_{error} . The resulting error impact from the jitter noise can be expressed as:

$$t_{error} = \frac{V_{error}}{\frac{dV_{in}}{dt}}$$

Because positive and negative pulses have opposite effects on the jitter, they effectively add jitter noise to the signal input to the PFD (Phase Frequency Detector) as shown in FIG. 4.

The amount of jitter noise in the low frequency region can be graphically shown by power and frequency spectrums. For example, a random data signal produces a power spectrum as illustrated in FIG. 7. This power spectrum is produced using the following equation:

$$\text{power} = k \frac{\sin^2\left(\frac{\pi f}{f_o}\right)}{\left(\frac{\pi f}{f_o}\right)^2},$$

where f_o is the bit rate and f is the frequency.

With respect to the frequency spectrum, if a random data stream is input to a PLL having the transfer curve of FIG. 8, the noise energy components that are in frequency regions that are below the PLL loop bandwidth are able to pass through the low pass filter of the PLL, as shown in FIG. 9. Therefore, the PLL reshapes the incoming clock signal based on the unfiltered jitter noise power spectrum, and outputs a recovered clock signal having jitter noise components that are related to the PLL transfer characteristics.

Because the recovered clock signal that is output by the PLL includes the low frequency energy noise of the combined data and clock signal, as shown by the shaded regions of FIG. 9, this low frequency noise causes the recovered clock signal to have errors, which consequently causes errors in the data signals output by devices that use the clock signal for data recovery.

The amount of jitter noise that passes through the PLL, and is included in the recovered clock signal, can be significantly reduced or eliminated by encoding the data

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signal. The encoding can be used to reduce the amount of low frequency energy introduced onto the recovered clock signal from the jitter noise by moving a major portion of the data signal's data frequency spectrum into a higher frequency region that is above the PLL bandwidth. The PLL low pass filter attenuates the high frequency jitter noise from the combined clock and encoded data signal, and recovers the lower frequency clock signal with a reduced amount of noise.

This movement of some jitter noise energy from lower frequency regions into higher frequency regions by encoding the data signal is apparent by comparing FIGS. 9 and 10. For example, the spectral energy distribution of a combined clock and unencoded data word is shown in FIG. 9. When a data signal is encoded, the encoding may include mapping an 8-bit data word onto a 10-bit data word for example. The mapping causes the combined clock and encoded data signal to have the spectral energy distribution as shown in FIG. 10.

A comparison of the differences between FIGS. 9 and 10 show that encoding a data word into a code space shifts the spectral energy distribution of the data word to higher frequencies, in order to move the energy of some low frequency jitter components of FIG. 9 into the higher frequencies of FIG. 10. For example, the amount of noise energy from the unencoded data signal that passes unfiltered through the PLL is shown by the energy distribution between the dotted lines of FIG. 9. This amount of noise energy is greater than the amount of noise energy from the encoded data signal that passes unfiltered through the PLL, which is shown in FIG. 10.

By shifting the energy spectrum of the combined clock and data signal away from the effective loop bandwidth of the PLL, the dependence on an unchanging front edge of the clock signal is substantially reduced or eliminated, permitting the front edge or both edges of the clock signal to be used for modulation.

The encoding causes the combined clock and encoded data signal to have characteristics that include minimizing or reducing jitter noise, such as inter-symbol interference and signal dispersion for example, in the combined signal that is transmitted over a band-limited channel. Because the PLL can filter the high frequency jitter component from the combined clock and encoded data signal, the encoding allows the PLL to attenuate the high frequency jitter noise energy from the combined signal as shown in FIG. 10.

As a result of encoding the data signal, therefore, the clock signal that is recovered by the PLL from the combined clock and encoded data signal has a reduced amount of noise energy, as shown by FIGS. 9 and 10. The recovered clock signal is sent to data recovery devices that use the clock signal to extract data either from a data signal or from the combined clock and encoded data signal. This extracted data has fewer errors because the recovered clock signal used by the data recovery devices has fewer errors, as compared to a clock signal recovered from a combined signal that includes an unencoded data signal.

One benefit of encoding the data is permitting a high frequency clock signal to be combined with encoded data to form a combined signal that is transmitted over a single channel, and permitting the clock signal and the encoded data signal of the transmitted combined signal to be recovered, because some low frequency components of the data signal are pushed to a higher frequency region by the data encoding. The high frequency may be a frequency that approaches the bandwidth of the clock channel, for example.

One method of data encoding uses minimal redundancy to increase the frequency spectrum of the energy introduced to

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the combined signal from modulating the data signal onto the clock signal, in order to reduce the amount of noise in the recovered clock signal. The minimal redundancy encoding method may include mapping the data signal by increasing the number of bits of data in the data signal before the data signal is mixed with the clock signal. Increasing the number of bits in the data signal allows most of the energy in the data signal to be placed in a frequency region that is high enough to be filtered by the PLL.

The encoding increases, or maximizes, the data transitions, thus moving some or all of the noise energy into a higher frequency spectrum region. For example, an embodiment of encoding data is shown in FIG. 11. The encoding 1110 includes a data encoder in which an input data word having p-bits is mapped into a data word having q-bits, where $q > p$. Therefore, the encoding method increases the number of data transitions in order to move some energy from the jitter noise into higher frequency regions.

The method may combine the encoded data word with a clock signal by modulating one or more edges of a clock signal pulse based on the encoded data word, 1120. For example, modulating the data word onto a clock signal pulse may use a transition maximized encoding scheme to move a rising edge, a falling edge, or both edges of one or more pulses of the clock signal based on the encoded data word. Alternatively, an encoding scheme with less than full transition maximization may be used. In one embodiment, the clock modulation based on the encoded data signal includes pre-emphasis of the combined signal, so that the inter-symbol interference of the combined signal that is transmitted over a band-limited channel is minimized or reduced.

Also, the data may be encoded so that an output data word is a function of both the instantaneous input word and earlier input data words. For example, an output encoded data word may be a function of a finite number of future input data words or a finite number of earlier output data words or both. Furthermore, the encoding method may also include scrambling the encoded data signal in order to encrypt the data while maintaining the data signal's energy shift to higher frequencies. The encrypted data may be decrypted at the receiving end. The encoding method may use a coding that is direct current (DC) balanced to minimize DC component of encoded signal. The type of encoding that is used may vary depending on the frequency used and the amount of jitter reduction effect required by the devices that use the recovered clock signal, such as data recovery devices for example.

The combined clock and encoded data word is then transmitted over a single channel, 1130. In one embodiment, the data may be transmitted in both directions on the clock line. In another embodiment, the data may be transmitted in the opposite direction from the clock only.

An example of a device 1200 to encode a data signal and to combine the clock signal and the encoded data signal is shown in FIG. 12. Many different implementations of this device, which may be a transition-maximized (or transition increasing) encoder 1210, can be used. For example, one embodiment of the encoder 1210 maps an 8-bit input coding space into a 10-bit output coding space. This coding can be extended to map a p-bit into a q-bit by using higher redundancy. For example, instead of using an 8-bit to 10-bit encoding, the encoder may use an 8-bit to 12-bit encoding in order to further remove lower frequency components in the input stream.

If the encoded data signal needs to be serialized, serializer 1220 may be used to serialize the encoded data signal. After the data signal is encoded and serialized, the encoded data

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signal is combined with the clock signal. The combining may be performed by modulator 1230, which modulates the clock signal based on the encoded data signal to generate a combined clock and encoded data signal.

For example, in one embodiment the modulator may use one or more edges of a first edge, such as a rising or a falling edge for example, of one or more pulses of the clock signal to send precise reference clock information. In this embodiment, the modulator may use one or more edges of a second edge, such as a falling or a rising edge for example, of one or more pulses of the clock signal to send digital data information. Other embodiments of modulation may also be used. For example, both the rising edges and falling edges of the clock signal pulses may be modulated as a function of the encoded data signal, because the impact caused by jitter is greatly reduced by the frequency spectrum characteristics of the combined clock and encoded data signal. The combined signal may be transmitted in one signal cable.

A system and a method to combine a data signal with a clock signal have been discussed. Encoding a data signal before combining the data signal with a high frequency clock signal permits some of the noise components that are moved to higher frequencies by the encoding to be attenuated by the PLL. Because the high frequency noise components are attenuated, the amount of noise in the recovered clock signal is reduced. Therefore, removing some of the noise energy from the combined signal increases the precision in the recovered clock signal that is output by the PLL. This recovered clock signal with a reduced amount of errors allows data recovery devices that use the clock signal to extract data, either from a data signal, or from the combined clock and encoded data signal. This extracted data has fewer errors than data extracted by a data recovery device that uses a noisy clock signal recovered from a combined clock and unencoded data signal.

Thus, combining a clock signal and a data signal increases the bandwidth of the clock channel so that this channel can transmit both clock and data simultaneously. In one embodiment, the data signal may be encoded. Encoding the data signal moves some of the energy components of the data signal to move into higher frequency regions that can be filtered by the PLL, and reduces the amount of noise in the received combined encoded data and clock signal. Therefore, the combined encoded data and clock signal can be transmitted at a frequency that approaches the bandwidth of the clock channel without being significantly affected by noise, such as inter-symbol interference or signal dispersion, for example. Furthermore, the encoding permits the PLL to filter the high frequency energy from the combined signal, and to recover an accurate clock signal that can be used by other devices.

These and other embodiments of the present invention may be realized in accordance with the teachings described herein and it should be evident that various modifications and changes may be made in these teachings without departing from the broader spirit and scope of the invention. The specification and drawings are, accordingly, to be regarded in an illustrative rather than restrictive sense and the invention measured only in terms of the claims.

We claim:

1. A method of transmitting data in a system including at least one data channel and a separate clock channel, the clock channel being used to decode data transmitted on the at least one data channel, comprising:

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combining a clock signal to be transmitted on the clock channel with a data signal having a plurality of data words to generate a combined clock and data signal, and

transmitting the combined clock and data signal on the clock channel;

wherein the data signal has been generated from the data words using an encoding scheme that shifts an energy spectrum of the combined clock and data signal away from an effective loop bandwidth of a clock recovery block.

2. The method of claim 1 wherein the encoding scheme maps the data word from a p-bit data word into a q-bit data word, where $q > p$.

3. The method of claim 2 wherein said encoding scheme is direct current (DC) balanced to minimize a DC component of the combined signal.

4. The method of claim 2 wherein said encoding scheme further comprises: increasing a number of transitions in each data word.

5. The method of claim 1 wherein the clock signal has a plurality of pulses, each pulse of the plurality of pulses having a front edge and a back edge, and wherein the combining step comprises: modulating the data signal onto the clock signal by moving the front or back edges of the plurality of pulses.

6. The method of claim 1 wherein the clock signal has a plurality of pulses, each pulse of the plurality of pulses having a front edge and a back edge, and wherein the combining step comprises: modulating the data signal onto the clock signal by moving the front edges of the plurality of pulses.

7. The method of claim 1 wherein the clock signal has a plurality of pulses, each pulse of the plurality of pulses having a first edge and a second edge, and wherein the combining step comprises: modulating the data signal onto the clock signal by moving both the front edges and the back edges of the plurality of pulses.

8. The method of claim 1 wherein the encoding scheme is an encryption scheme.

9. A method of transmitting data in a system including at least one data channel and a separate clock channel, the clock channel being used to decode data transmitted on the at least one data channel, comprising:

combining a clock signal to be transmitted on the clock channel with a data signal having a plurality of data words to generate a combined clock and data signal, performing pre-emphasis to the combined signal, so that inter-symbol interference of the combined signal transmitted over a band-limited channel is minimized or reduced, and

transmitting the combined clock and data signal on the clock channel;

wherein the data signal has been generated from the data words using an encoding scheme that shifts an energy spectrum of the combined clock and data signal away from an effective loop bandwidth of a clock recovery block.

10. A method of transmitting data in a system including at least one data channel and a separate clock channel, the clock channel being used to decode data transmitted on the at least one data channel, comprising:

combining a clock signal to be transmitted on the clock channel with a data signal having a plurality of data words to generate a combined clock and data signal, and

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transmitting the combined clock and data signal on the clock channel;

wherein the data signal has been generated from the data words using an encoding scheme that shifts an energy spectrum of the combined clock and data signal away from an effective loop bandwidth of a clock recovery block,

wherein the encoding scheme includes the step of: encoding an instantaneous data word of said plurality of data words as function of both the instantaneous input word and earlier data words in the data signal.

11. A method of transmitting data in a system including at least one data channel and a separate clock channel, the clock channel being used to decode data transmitted on the at least one data channel, comprising:

combining a clock signal to be transmitted on the clock channel with a data signal having a plurality of data words to generate a combined clock and data signal, and

transmitting the combined clock and data signal on the clock channel;

wherein the data signal has been generated from the data words using an encoding scheme that shifts an energy spectrum of the combined clock and data signal away from an effective loop bandwidth of a clock recovery block,

wherein the encoding scheme includes the step of: encoding one of the data words of said plurality of data words as a function of one of the following: future data words; or earlier data words; or future and earlier data words; of said plurality of data words.

12. A method of transmitting data in a system including at least one data channel and a separate clock channel, the clock channel being used to decode data transmitted on the at least one data channel, comprising:

providing a clock signal having a plurality of pulses, each pulse of the plurality of pulses having a front edge and a back edge;

modulating a data signal having a plurality of data words onto the clock signal by moving at least one edge of the plurality of pulses, thereby to create a combined clock and data signal; and

transmitting the combined clock and data signal on the clock channel.

13. The method of claim **12** further comprising: encoding the data words using an encoding scheme that maps the data words from p-bit data words into a q-bit data words, where $q > p$.

14. The method of claim **13** wherein the encoding scheme is direct current (DC) balanced to minimize a DC component of the combined signal.

15. The method of claim **12** wherein the modulating step comprises: modulating the data signal onto the clock signal by moving both of the front and back edges of the plurality of pulses.

16. The method of claim **12** wherein the modulating step comprises: modulating the data signal onto the clock signal by moving the front edges of the plurality of pulses.

17. The method of claim **12** wherein the modulating step comprises: modulating the data signal onto the clock signal by moving the back edges of the plurality of pulses.

18. The method of claim **12** further comprising: encoding the data words using an encoding scheme that increasing a number of transitions in each data word.

19. The method of claim **18** wherein the encoding scheme is an encryption scheme.

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20. A method of transmitting data in a system including at least one data channel and a separate clock channel, the clock channel being used to decode data transmitted on the at least one data channel, comprising:

providing a clock signal having a plurality of pulses, each pulse of the plurality of pulses having a front edge and a back edge,

modulating a data signal having a plurality of data words onto the clock signal by moving at least one edge of the plurality of pulses, thereby to create a combined clock and data signal,

performing pre-emphasis to the combined signal, so that inter-symbol interference of the combined signal transmitted over a band-limited channel is minimized or reduced; and

transmitting the combined clock and data signal on the clock channel.

21. A method of transmitting data in a system including at least one data channel and a separate clock channel, the clock channel being used to decode data transmitted on the at least one data channel, comprising:

providing a clock signal having a plurality of pulses, each pulse of the plurality of pulses having a front edge and a back edge,

modulating a data signal having a plurality of data words onto the clock signal by moving at least one edge of the plurality of pulses, thereby to create a combined clock and data signal,

encoding an instantaneous data word of said plurality of data words as function of both the instantaneous input word and earlier data words in the data signal; and

transmitting the combined clock and data signal on the clock channel.

22. A method of transmitting data in a system including at least one data channel and a separate clock channel, the clock channel being used to decode data transmitted on the at least one data channel, comprising:

providing a clock signal having a plurality of pulses, each pulse of the plurality of pulses having a front edge and a back edge,

modulating a data signal having a plurality of data words onto the clock signal by moving at least one edge of the plurality of pulses, thereby to create a combined clock and data signal,

encoding one of the data words of said plurality of data words as a function of one of the following: future data words; or earlier data words; or future and earlier data words; of said plurality of data words; and

transmitting the combined clock and data signal on the clock channel.

23. A system for transmitting data, comprising

a transmitter including at least one data channel and a separate clock channel, the clock channel being used by a receiver to decode data transmitted on the at least one data channel, the transmitter being operative to:

combine a clock signal to be transmitted on the clock channel with a data signal having a plurality of data words, to generate a combined clock and data signal, and

transmit the combined clock and data signal on the clock channel; wherein the data signal has been generated from the data words using an encoding scheme that shifts an energy spectrum of the combined clock and data signal away from an effective loop bandwidth of a clock recovery block.

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24. The system of claim 23 wherein the encoding scheme maps the data word from a p-bit data word into a q-bit data word, where $q > p$.

25. The system of claim 23 wherein the clock signal has a plurality of pulses, each pulse of the plurality of pulses having a front edge and a back edge, and wherein the transmitter combines the clock signal with the data signal by: modulating the data signal onto the clock signal by moving at least one edge of the plurality of pulses.

26. The system of claim 23 wherein the clock signal has a plurality of pulses, each pulse of the plurality of pulses having a front edge and a back edge, and wherein the transmitter combines the clock signal with the data signal by: modulating the data signal onto the clock signal by moving the front edges of the plurality of pulses.

27. The system of claim 23 wherein the clock signal has a plurality of pulses, each pulse of the plurality of pulses having a first edge and a second edge, and wherein the transmitter combines the clock signal with the data signal by: modulating the data signal onto the clock signal by moving both the front edges and the back edges of the plurality of pulses.

28. A system for transmitting data, comprising a transmitter including at least one data channel and a separate clock channel, the clock channel being used by a receiver to decode data transmitted on the at least one data channel, the transmitter being operative to: provide a clock signal having a plurality of pulses, each pulse of the plurality of pulses having a front edge and a back edge; modulate a data signal having a plurality of data words onto the clock signal by moving at least one edge of the plurality of pulses, thereby to create a combined clock and data signal; and transmit the combined clock and data signal on the clock channel.

29. The system of claim 28 wherein the transmitter is further operative to: encode the data words using an encoding scheme that maps the data words from p-bit data words into a q-bit data words, where $q > p$.

30. The system of claim 28 wherein the transmitter is further operative to: modulate the data signal onto the clock signal by moving both of the front and back edges of the plurality of pulses.

31. The system of claim 28 wherein the transmitter is further operative to: modulate the data signal onto the clock signal by moving the front edges of the plurality of pulses.

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32. The system of claim 28 wherein the transmitter is further operative to: modulating the data signal onto the clock signal by moving the back edges of the plurality of pulses.

33. The system of claim 28 wherein the transmitter uses an encoding scheme for generating the data signal from the data words that shifts an energy spectrum of the combined clock and data signal away from an effective loop bandwidth of a clock recovery block.

34. A method of transmitting data in a system including at least one data channel and a separate clock channel, the method comprising:

combining a clock signal to be transmitted on the clock channel with an encoded data signal having a plurality of encoded data words to generate a combined clock and encoded data signal;

the clock signal having a plurality of pulses and each pulse having a front edge and a back edge and a pulse width defined by the time difference of the front edge and back edge;

the combining further including encoding an unencoded data to generate an encoded data and modulating the encoded data onto the clock signal based on the encoded data by: (i) moving the front edge only of a particular pulse, (ii) moving the back edge only of a particular pulse, or (iii) moving both the front edge and the back edge of a particular pulse by different amounts or in different directions, wherein the movement in any of the cases causing a change in a change in the width of the particular pulse and the moving of at least one edge is effective to combine the encoded data signal onto the clock signal; and

transmitting the combined clock and encoded data signal on the clock channel;

wherein the encoded data signal is generated from the unencoded data words using an encoding scheme that shifts an energy spectrum of the combined clock and encoded data signal away from an effective loop bandwidth of a clock recovery block.

35. A method as in claim 34, wherein the modulating of the data signal onto the clock signal is performed after an encoding and a serialization of the data signal.

* * * * *

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

**SUPER INTERCONNECT
TECHNOLOGIES LLC,**

Plaintiff,

v.

GOOGLE LLC,

Defendant.

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JURY TRIAL DEMANDED

CIVIL ACTION NO. 6:21-cv-00259

PLAINTIFF’S CERTIFICATE OF INTERESTED PARTIES

Plaintiff files this certificate pursuant to Rule 7.1 of the Federal Rules of Civil Procedures and states the following:

Plaintiff Super Interconnect Technologies LLC (“SIT”) states that it is a Texas limited liability company wholly-owned by Acacia Research Group LLC. Acacia Research Group LLC is a wholly-owned subsidiary of Acacia Research Corporation, a publicly owned company.

Dated: March 15, 2021

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing document was filed electronically in compliance with Local Rule CV-5. Therefore, this document was served on all counsel who are deemed to have consented to electronic service on this the 15th day of March 2021.

/s/Jeffrey R. Bragalone
Jeffrey R. Bragalone

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

SUPER INTERCONNECT
TECHNOLOGIES LLC,

Plaintiff,

vs.

GOOGLE LLC,

Defendant.

Civil Action No. 6:21-cv-259-ADA

JURY TRIAL DEMANDED

FILED UNDER SEAL

**DEFENDANT GOOGLE LLC'S MOTION TO TRANSFER VENUE TO THE
NORTHERN DISTRICT OF CALIFORNIA UNDER 28 U.S.C. § 1404(a)**



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I. INTRODUCTION

Google LLC (“Google”) requests transfer of this action to the Northern District of California (“NDCA”) under 28 U.S.C. § 1404(a). This case is Plaintiff Super Interconnect Technologies LLC’s (“SIT”) second attempt to file an action against Google in the wrong district, with its prior case in the Eastern District of Texas (“EDTX”) having recently been dismissed for improper venue. Its case does not belong here in the Western District of Texas (“WDTX”) either. Because SIT’s earlier-filed case in the EDTX had proceeded through fact discovery before being dismissed, there is no question regarding the relevant sources of proof or their location in the current action. As demonstrated by the record already developed in the EDTX action, the NDCA is a more convenient venue for virtually all witnesses, holds the majority of the sources of proof, and has subpoena power over the non-party witnesses.

Indeed, because fact discovery closed in the EDTX action and all the relevant party and non-party witnesses were deposed, there can be no dispute that nearly all those witnesses were located in or near the NDCA. For example, all Google personnel with knowledge about technical, financial, and marketing aspects of the accused Pixel smartphone products live and work in the NDCA. The NDCA is more convenient even for SIT’s main witnesses, who are located in Orange County, California. The NDCA is also home to the two inventors deposed in the EDTX action, including the first inventor of all three asserted patents, as well as the original assignee of the patents, Silicon Image. The vast majority of the sources of proof are also either in the NDCA, at Google’s headquarters, with the inventors, or with Lattice Semiconductor, which acquired Silicon Image. In addition, third-party Qualcomm—who designs the processors in Pixel products that implement the accused functionality—is headquartered in San Diego and has made its source code available for inspection in Los Angeles. In contrast, no relevant witnesses or evidence are in the WDTX.

Other factors also support transfer. The NDCA has subpoena power over not only the inventors, but also over Qualcomm. And being the location of Google's headquarters and the alleged inventions, the NDCA also has a strong interest in this litigation. In contrast, the WDTX has no interest, as neither Google, SIT, nor any third party has relevant ties to the WDTX.

The Court should therefore reject SIT's second bite at venue and grant transfer to the NDCA, a clearly more convenient forum.

II. FACTUAL BACKGROUND

A. After EDTX Dismissal For Improper Venue, SIT Re-files In WDTX

On November 2, 2018, SIT filed suit against Google in the EDTX (the "EDTX Action") with the same allegations as this lawsuit in this District. In particular, SIT asserts the same three Patents-in-Suit¹ against the same products, Google Pixel smartphones ("Pixel Products"). *Super Interconnect Techs. LLC v. Google LLC*, No. 2:18-cv-00463 (E.D. Tex.) (consolidated with *Super Interconnect Techs. LLC v. Huawei Device Co., Ltd.*, No. 2:18-cv-00462 (E.D. Tex.) for pretrial issues); Ex. 1² (EDTX -463 Dkt. 1) ¶¶ 15-17, 30-32, 44-46. Google filed a Rule 12(b)(3) motion to dismiss for improper venue, which the EDTX court denied. (Exs. 2, 3 (EDTX -463 Dkts. 21, 29).) On February 13, 2020, the Federal Circuit granted Google's petition for a writ of mandamus and ordered the EDTX to dismiss or transfer the case. *In re Google LLC*, 949 F.3d 1338, 1339 (Fed. Cir. 2020). Following that ruling, the EDTX stayed the case on February 18, 2020. (Ex. 4 (EDTX -462 Dkt. 102).)

Before the stay, the parties had (1) completed claim construction, with the EDTX court

¹ The three Patents-in-Suit are U.S. Patent Nos. 7,627,044 (Dkt. 1-2); 6,463,092 (Dkt. 1-3); and 7,158,593 (Dkt. 1-4).

² References to Ex. __ refer to exhibits attached to the Declaration of Mark Liang, filed concurrently herewith.

issuing a *Markman* order; (2) completed fact discovery, including depositions of party and non-party witnesses; and (3) proceeded partway through expert discovery, having served opening expert reports. (Liang Decl. ¶¶ 6-7, Ex. 5 (EDTX -462 Dkt. 93).)

On March 12, 2021, in compliance with the Federal Circuit's order, the EDTX dismissed SIT's case. (Ex. 6 (EDTX -462 Dkt. 111 at 4).) The next business day, SIT filed a substantively identical complaint in this Court. (Dkt. 1; Ex. 7 (Redline WDTX Complaint vs. EDTX FAC).)

B. The Relevant Witnesses And Evidence Are In The NDCA Or Elsewhere In California And The West Coast

SIT alleges that the Pixel Products infringe each Patent-in-Suit based on their purported compliance with the Universal Flash Storage ("UFS") and M-PHY technology standards. (Dkt. 1 ¶¶ 12, 15-17, 28, 31-33, 44, 47-49.) Non-party Qualcomm supplies the processor component in the Pixel Products that purportedly implements the accused UFS and M-PHY standards, and SIT sought and obtained discovery from Qualcomm in the EDTX Action. (Exs. 8, 27 (SIT's Subpoena to Qualcomm, Email - Qualcomm's Source Code).) As discovery in the EDTX Action confirmed, nearly all relevant witnesses and evidence regarding the Patents-in-Suit and the accused Pixel Products are in the NDCA or elsewhere on the West Coast.

1. Google's Evidence And Witnesses Are In The NDCA

Google is headquartered in the NDCA (Mountain View, California), and the majority of its U.S. workforce is in the NDCA. (Golueke Decl. ¶ 3.) Google witnesses with relevant technical, financial, and marketing knowledge about the accused Pixel Products are located in the NDCA and work out of Google's Mountain View headquarters. (*Id.* ¶ 5.) These witnesses are identified in the table below. (*Id.* ¶¶ 6-11.)

Google Witness	Job Title	Relevant Knowledge
Madhav Chitlu	Memory commodity and supply manager	Google's business relationship with memory and storage component suppliers for the accused Pixel Products
Michael Diamond	Hardware engineer, engineering manager for Pixel system integration team	Circuit board design and accused UFS interfaces in the Pixel Products
Nick Yoswa	Senior finance analyst	Financial data, statements, accounting, and records for the Pixel Products
Abhijit Ravi	Head of Pixel Product Marketing	Google's marketing, promotion, and business information regarding the accused Pixel Products
James Maccoun	Patent counsel	Google's patent license agreements and licensing practices

All these witnesses were deposed as Google's Rule 30(b)(6) corporate witnesses in the EDTX Action. (Liang Decl. ¶¶ 11-16, Exs. 9-14 (Dep. Tr. Excerpts).) Another, sixth Google employee located in the NDCA, Harleen Juneja, was also deposed as a corporate witness; she has since left Google but remains in the NDCA. (Liang Decl. ¶¶ 17-18, Exs. 14-15 (Juneja Dep. Tr. Cover, LinkedIn Profile).)

As with the witnesses, all the relevant technical, financial, and marketing documents for the Pixel Products are located in the NDCA. (Golueke Decl. ¶ 13.) None of these documents are located in the WDTX. (*See id.* ¶¶ 12-13.) Although Google has offices in Austin, no Google employees in Austin—or anywhere else in Texas—are knowledgeable about technical, financial, or marketing issues for the accused Pixel Products. (*Id.*)

2. SIT's Evidence And Witnesses Are Also In California

Plaintiff SIT is a patent assertion entity with no ties to the WDTX. The Complaint's allegation that SIT is located in Austin (Dkt. 1 ¶ 1) is contradicted by SIT's most recently filed Texas Franchise Tax Public Report, which identifies SIT's address as in Frisco, Texas in the EDTX. (Ex. 16 (2020 SIT Public Report).) It was also contradicted by SIT's employees. Holly Hernandez, a SIT employee deposed in the EDTX Action, testified that SIT's only office was

located in Frisco, not in Austin. (Ex. 17 (Hernandez Dep. Tr.) at 27:16-25, 28:1-3, 41:20-22.)

And SIT's CEO, Marc Booth, also confirmed that SIT's only office is in Frisco. (Ex. 18 (Booth Dep. Tr.) at 50:25-51:23.)

SIT has [REDACTED] Mr. Booth, Ms. Hernandez, and Eric Lucas. (*Id.* at 52:6-13.) All three are [REDACTED]
[REDACTED], [REDACTED]
[REDACTED]. (Ex. 19 (Lucas Dep. Tr.) at 33:5-9; Ex. 17 (Hernandez Dep. Tr.) at 42:2-4.) Both Acacia entities are headquartered in Orange County, California. (Dkt. 4; Ex. 20 (Acacia Res. Corp. 10-K); Ex. 18 (Booth Dep. Tr.) at 9-10.) Acacia Research Group holds itself out as an "industry leader in patent licensing." (Ex. 21 (Acacia Webpage).)

SIT's top executives, Mr. Booth (CEO) and Mr. Lucas (President), were designated by SIT in the EDTX Action as its corporate witnesses on most of Google's Rule 30(b)(6) topics, and both were deposed in in Orange County, California, [REDACTED]. (Ex. 22 (Email from SIT counsel - Deposition planning); Exs. 16-18 at 1.)

Mr. Booth is located in [REDACTED] (Ex. 23 (Booth LinkedIn).) Besides acting as the CEO of SIT, he is the President and CEO of Acacia Research Group and the Chief IP Officer of Acacia Research Corporation. (Ex. 18 (Booth Dep. Tr.) at 47:6-20; *see also* Ex. 20 (Acacia 10-K) at 6.) Mr. Lucas is located in [REDACTED] (Ex. 24 (Lucas LinkedIn).) In addition to being the President of SIT, he is a Senior Vice President of Acacia Research Group. (Ex. 19 (Lucas Dep. Tr.) at 26:18-25, 27:3-5, 18-19.)

3. Key Third-Party Witnesses And Evidence Are In The NDCA Or Elsewhere In California And The West Coast

Non-party supplier Qualcomm is a Delaware corporation, headquartered in San Diego, California. (Exs. 25, 26 (Qualcomm Webpage, 10-K).) Qualcomm [REDACTED]

██████████ in San Diego. (Ex. 10 (Diamond Dep. Tr.) at 163:12-14.) During fact discovery in the EDTX Action, Qualcomm made its source code for the accused functionality available ██████████ ██████████ in Los Angeles, California. (Ex. 27 (Email - Qualcomm’s Source Code).)

Two of the inventors of the Patents-in-Suit, Gyudong Kim and Min-Kyu Kim, live in the NDCA and were deposed in the NDCA during the EDTX Action. (Exs. 28-31 (LinkedIn profiles, Dep. Trs.)) Both currently work at Analog Devices in the San Francisco Bay Area. (*Id.*) Gyudong Kim is the first-named inventor on all three Patents-in-Suit. (Dkts. 1-2–1-4.) The patents were originally assigned to Silicon Image, Inc., which was located in Sunnyvale, California, also in the NDCA, before it was acquired in 2015 by another company, Lattice Semiconductor (“Lattice”). (*Id.*; Ex. 32 (Garcia Decl.)) Lattice is headquartered in Hillsboro, Oregon, and maintains a Development Center in San Jose, California. (Ex. 33 (Lattice Webpage).) In response to a subpoena in the EDTX Action, Lattice produced patent and invention-related documents, originating from Silicon Image. (Exs. 32, 34 (Garcia Decl., Lattice Subpoena).) Lattice also produced a declaration from Jaime Garcia, a former Silicon Image (and now Lattice) employee ██████████ authenticating and providing business record foundation for the documents. (*Id.*)

III. LEGAL STANDARD

To evaluate transfer under 28 U.S.C. § 1404(a), courts first consider “whether a civil action ‘might have been brought’ in the destination venue.” *In re Volkswagen of Am., Inc.*, 545 F.3d 304, 312 (5th Cir. 2008) (en banc) (“*Volkswagen IP*”). If so, courts weigh eight private and public factors:

- (1) the relative ease of access to sources of proof;
- (2) the availability of compulsory process to secure the attendance of witnesses;
- (3) the cost of attendance for willing witnesses;
- (4) all other practical problems that make trial of a case easy, expeditious

and inexpensive[;] ... [5] the administrative difficulties flowing from court congestion; [6] the local interest in having localized interests decided at home; [7] the familiarity of the forum with the law that will govern the case; and [8] the avoidance of unnecessary problems of conflict of laws [or in] the application of foreign law.

Id. at 315 (internal citations and quotation marks omitted).

IV. THE NDCA IS A CLEARLY MORE CONVENIENT FORUM THAN THE WDTX

A. SIT Could Have Brought This Action In The Northern District Of California

As SIT admits, Google is headquartered in the NDCA. (Dkt. 1 ¶ 2.) Thus, SIT could have filed this lawsuit in the NDCA, where Google has a “regular and established place of business.” 28 U.S.C. § 1400(b); *In re Cray Inc.*, 871 F.3d 1355, 1360 (Fed. Cir. 2017).

B. All Private Interest Factors Favor Transfer To The NDCA

The private factors strongly favor transfer to the NDCA because, as fact discovery in the EDTX Action demonstrates, the NDCA is more convenient for the vast majority of witnesses of Google, SIT, and relevant third parties. Most relevant party and third-party evidence is similarly located in or near the NDCA, which has subpoena power over witnesses in California. In contrast, this case has no connection to the WDTX.

1. Cost Of Attendance For Willing Witnesses Heavily Favors Transfer To The NDCA

The “single most important factor in [the] transfer analysis” is the convenience and cost for witnesses to travel and attend trial. *In re Genentech, Inc.*, 566 F.3d 1338, 1343 (Fed. Cir. 2009). Courts “routinely afford more weight to the convenience and cost for *non-party* witnesses,” but “also appropriately consider[] the cost of attendance of *all* willing witnesses.” *Polaris Innovations, Ltd. v. Dell, Inc.*, No. SA-16-CV-451-XR, 2016 U.S. Dist. LEXIS 167263, at *22 (W.D. Tex. Dec. 5, 2016). Under the Fifth Circuit’s 100-mile rule, “[w]hen the distance between an existing venue for trial . . . and a proposed venue under § 1404(a) is more than 100

miles, the factor of inconvenience to witnesses increases in direct relationship to the additional distance to be traveled.” *In re Volkswagen AG*, 371 F.3d 201, 204-05 (5th Cir. 2004) (“*Volkswagen I*”).

Here, the convenience of witnesses favors transfer to the NDCA. Google’s employees with knowledge regarding technical, financial, and marketing aspects of the accused Pixel Products are all in the NDCA. (Golueke Decl. ¶¶ 5-11.) For all six Google employees who were deposed in the EDTX Action, “it is more convenient [] to testify at home” in the NDCA. *See Volkswagen II*, 545 F.3d at 317. There is no direct flight from the Bay Area to Waco. Traveling to Waco from the Bay Area requires at least five hours of flight time (including a layover in Dallas), not including time spent traveling to and from and waiting at the airport. (Liang Decl. ¶ 38, Ex. 35 (Flights SFO-ACT).) The long trips and overnight stays in Waco will lead to lost productivity and disruption to the witnesses’ lives while “being away from work, family, and community.” *Volkswagen II*, 545 F.3d at 317. By contrast, if this case were transferred to the NDCA, Google employees could readily travel back and forth between court and their homes—a “thirty minutes [to] an hour” commute—as compared to traveling “five or six hours one-way” to Waco. *See Volkswagen I*, 371 F.3d at 205 (“[T]he task of scheduling fact witnesses so as to minimize the time when they are removed from their regular work or home responsibilities gets increasingly difficult and complicated when the travel time from their home or work site to the court facility is five or six hours one-way as opposed to 30 minutes or an hour.”).

Similarly, for [REDACTED] SIT witnesses—who are Acacia executives located in Orange County—the NDCA is a closer and more convenient venue. There is no direct flight from Orange County (or Los Angeles) to Waco either. Traveling to Waco from Orange County (or Los Angeles) also requires at least five hours of flight time. (Liang Decl. ¶ 39, Ex. 36

(Flights SNA-ACT, LAX-ACT).) Transferring the case to the NDCA would make the trial more convenient for SIT witnesses as well, due to many available one-hour-and-a-half nonstop flights from Orange County to the Bay Area. (Liang Decl. ¶ 40, Ex. 37 (Flights SNA-SFO).)

The convenience of non-party witnesses also strongly favors transfer. To the extent the inventors are willing to testify, they are at home in the NDCA. *Supra* Section II.B.3. And to the extent Qualcomm witnesses at its San Diego headquarters are willing witnesses, they would also find it more convenient to testify in the NDCA—a day trip involving short one-and-a-half-hour nonstop flights each way—compared to nearly five hours to reach Waco. (Liang Decl. ¶¶ 41-42, Exs. 38-39 (Flights SAN-SFO, SAN-ACT).)

Meanwhile, there is no witness relevant to this case who resides in this District. (Golueke Decl. ¶ 12.) And though SIT contends it is located in Austin, both its public filings and its employees’ sworn testimony indicate otherwise. *Supra* Section II.B.2.

Transfer is thus appropriate because “[a] substantial number of party witnesses, in addition to the inventor[s] . . . reside in or close to the Northern District of California.” *In re Acer Am. Corp.*, 626 F.3d 1252, 1255 (Fed. Cir. 2010); *see also In re Tracfone Wireless, Inc.*, No. 2021-136, 2021 U.S. App. LEXIS 11388, at *3, 6 (Fed. Cir. Apr. 20, 2021) (finding that the convenience of witnesses favored transfer where “no party identified any witness residing in the Western District of Texas” and “several of [defendant]’s likely employees resid[ed] in the transferee venue”). This most important factor favors transfer.

2. Relative Ease Of Access To Sources Of Proof Favors Transfer To The NDCA

As this Court has noted, “[i]n patent infringement cases, the bulk of the relevant evidence usually comes from the accused infringer. Consequently, the place where the defendant’s documents are kept weighs in favor of transfer to that location.” *Parus Holdings Inc. v. LG*

Elecs. Inc., No. 6:19-CV-00432-ADA, 2020 U.S. Dist. LEXIS 150926, at *10 (W.D. Tex. Aug. 20, 2020) (quoting *In re Genentech*, 566 F.3d at 1345). As the Court has also noted, “under current Fifth Circuit precedent, the physical location of electronic documents does affect the outcome of this factor.” *Moskowitz Family LLC v. Globus Med.*, No. 6:19-cv-00672, 2020 U.S. Dist. LEXIS 145438, at *8 n.2 (W.D. Tex. July 2, 2020) (citing *Volkswagen II*, 545 F.3d at 316).

Here, the relevant sources of proof are in the NDCA or elsewhere on the West Coast, and therefore more easily accessed from the NDCA than the WDTX. Google keeps technical, financial, marketing, and licensing documents relevant to the accused Pixel Products at its Mountain View headquarters, where the employees who create and maintain them are located. (Golueke Decl. ¶ 13.) Google is not aware of any relevant documents kept in the WDTX concerning the research, development, marketing, or financials for the accused Pixel Products. (*Id.* ¶¶ 12-13.)

Key third-party documentary evidence is likewise located in the NDCA or elsewhere on the West Coast. Two of the inventors, including the first-named inventor on all Patents-in-Suit, live and work in the NDCA. *Supra* Section II.B.3. Invention-related documents are at Lattice Semiconductor's Silicon Valley location in the NDCA or its Oregon headquarters, which is much closer to the NDCA than to the WDTX. *See id.* And Qualcomm produced its source code for physical inspection in Los Angeles, which is also more easily accessed from the NDCA than from the WDTX. *Id.*

In contrast, no relevant sources of proof are in the WDTX. SIT has not identified a single relevant document located in this District and does not appear to carry any business activities in this District. *Supra* Section II.B.2. [REDACTED]

See *id.* To the

extent that SIT has any relevant documentary evidence, it is also likely located in California. This factor thus favors transfer. *See In re HP Inc.*, 826 F. App'x 899, 902 (2020) (mandating transfer to the NDCA where most physical sources of proof were present in the NDCA, and none were in the EDTX).

3. Availability Of Compulsory Process Favors Transfer To The NDCA

“Transfer is strongly favored where, as here, a transferee district like the NDCA, “has absolute subpoena power over a greater number of non-party witnesses.” *Adaptix, Inc. v. HTC Corp.*, 937 F. Supp. 2d 867, 874 (E.D. Tex. 2013). A court may subpoena a person (a) within 100 miles of where a person resides or works, or (b) within the state when the witness is a party, an officer of the party, or would not incur substantial expense to attend trial. Fed. R. Civ. P. 45(c)(1).

Here, material third-party witnesses are located in California, within the subpoena power of the NDCA but not the WDTX. *Id.* Both inventors who were deposed, including the first inventor on all three Patents-in-Suit, are in the Bay Area and can be subpoenaed by the NDCA—but not by the WDTX. *See supra* Section II.B.3. Jaime Garcia, the Lattice employee, who provided a declaration regarding Lattice’s third-party production, [REDACTED] and thus under only the NDCA’s subpoena power. *See id.* And employees at Qualcomm’s San Diego headquarters are also under the NDCA—but not the WDTX—subpoena power. *See id.* Finally, because SIT is a subsidiary [REDACTED] Acacia entities and employees in Orange County, California, even relevant information about SIT could require subpoenaing Acacia employees. Only the NDCA has subpoena power over those Acacia employees, while the WDTX does not.

In contrast, SIT has not identified—and Google is not aware of—any third-party witnesses in this District or Texas. This factor also weighs in favor of transfer.

4. Other Practical Problems For An Easy, Expeditious, And Inexpensive Case Are Neutral

This factor “considers problems such as those rationally based on judicial economy which will weigh heavily in favor of or against transfer.” *Moskowitz*, 2020 U.S. Dist. LEXIS 145438, at *14. This factor is neutral, as neither the WDTX nor the NDCA has experience with the Patents-in-Suit. So far in this case, no schedule has been entered, Google has not yet answered the Complaint, and no other motions have been filed except a concurrently filed motion to stay pending resolution of this transfer motion. Further, transfer to the NDCA is unlikely to cause delays, as this District has seen four times more patent cases filed here than in the NDCA in the last year. *See* Ex. 40 (DocketNav Statistics).

C. The Public Interest Factors Also Weigh In Favor Of Transfer

1. NDCA Has A Strong Local Interest In This Dispute

The NDCA has a strong local interest in this case, “because the cause of action calls into question the work and reputation of several individuals residing in or near that district.” *In re Hoffmann-La Roche Inc.*, 587 F.3d 1333, 1336 (Fed. Cir. 2008). Google was founded and maintains its headquarters and largest offices in the NDCA, designed the accused Pixel Products there, and its personnel, documentary records, and ongoing activities relating to the Pixel Products are in the NDCA. *Supra* Section II.B.1. The strong connection to the accused instrumentalities of the NDCA means that it has a “far stronger local interest in the case than the Western District of Texas.” *In re Tracfone*, 2021 U.S. App. LEXIS 11388, at *10. The NDCA’s far stronger local interest is further bolstered by the facts that the asserted patents were also invented in the NDCA and the named inventors are located in the NDCA, as is their current employer Analog Devices and as was the original assignee, Silicon Image. *Supra* Section II.B.3; Dkts. 1-2-1-4.

By contrast, this District has no interest in protecting SIT's patents or any other interest in this case. SIT is not based in this District. And while SIT is putatively a Texas LLC based in Frisco, Texas, SIT is in fact controlled by Acacia entities based in Orange County, California. *See supra* Section II.B.2.

Because the NDCA has a strong local interest in this case, this factor favors transfer.

2. The Median Time To Jury Trial Favors Transfer

Based on statistics for the 2010–2020 period, the median time to jury trial in patent cases in the NDCA is 2.37 years, versus 2.62 years in the WDTX. (Ex. 41 (DocketNav Time to Trial).) While this Court has recently streamlined its patent litigation procedure, court speed “appears to be the most speculative” of the factors in the transfer analysis, and “should not alone outweigh all of [the] other factors.” *In re Genentech*, 566 F.3d at 1347; *Harland Clarke Holdings Corp. v. Milken*, 997 F. Supp. 2d 561, 587 (W.D. Tex. 2014) (transferring case despite finding this factor weighing slightly against transfer).

3. The Remaining Public Interest Factors Are Neutral

Familiarity with the governing law is neutral, as both the NDCA and the WDTX are well versed in patent law. And because there is no prospect for any conflict of laws, the last public interest factor is also neutral.

V. CONCLUSION

The Court should reject SIT's second attempt at forum shopping and transfer the case to the NDCA, a clearly more convenient venue for this litigation.

Dated: April 27, 2021

Respectfully submitted,

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CERTIFICATE OF CONFERENCE

On April 22, pursuant to Local Rule CV-7, counsel Mark Liang for Defendant met and conferred with counsel Jeffrey Bragalone for Plaintiff, and counsel for Plaintiff indicated on April 26, 2021, that Plaintiff is opposed to the relief sought by this Motion.

Dated: April 27, 2021

/s/ Mark Liang

Mark Liang

CERTIFICATE OF SERVICE

Pursuant to the Federal Rules of Civil Procedure and Local Rule CV-5, I hereby certify that, on April 27, 2021, all counsel of record who have appeared in this case are being served with a copy of the foregoing via the Court's CM/ECF system.

Dated: April 27, 2021

/s/ J. Mark Mann

J. Mark Mann

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

SUPER INTERCONNECT
TECHNOLOGIES LLC,

Plaintiff,

vs.

GOOGLE LLC,

Defendant.

Civil Action No. 6:21-cv-259-ADA

JURY TRIAL DEMANDED

FILED UNDER SEAL

**DECLARATION OF MARK LIANG IN SUPPORT OF GOOGLE LLC'S MOTION TO
TRANSFER VENUE TO THE NORTHERN DISTRICT OF CALIFORNIA**

I, Mark Liang, hereby declare as follows:

1. I am an attorney at the law firm of O'Melveny & Myers LLP, located at Two Embarcadero Center, 28th Floor, San Francisco, CA 94111-3823, and counsel of record for Defendant Google LLC ("Google") in the above-captioned action. I have personal knowledge of the facts stated herein and if called to testify could and would competently testify thereto.

2. Attached as Exhibit 1 is a true and correct annotated copy of the Complaint filed by Super Interconnect Technologies LLC ("SIT") filed at Dkt. 1 in *Super Interconnect Technologies LLC v. Google LLC*, No. 2:18-cv-00463 (E.D. Tex.) ("EDTX Action").

3. Attached as Exhibit 2 is a true and correct copy of Google's redacted motion to dismiss for improper venue, filed at Dkt. 21 in the EDTX Action.

4. Attached as Exhibit 3 is a true and correct copy of the court's order filed at Dkt. 29 in the EDTX Action.

5. Attached as Exhibit 4 is a true and correct copy of the court's order filed on February 18, 2020, at Dkt. 102 in the lead case *Super Interconnect Technologies LLC v. Huawei Device Co., Ltd.*, No. 2:18-cv-00462 (E.D. Tex.), granting a stay of the EDTX Action.

6. I was counsel of record for Google in the EDTX Action. By February 18, 2020, the parties in the EDTX Action had (1) completed fact discovery, including depositions of party and non-party witnesses; (2) served opening expert reports; and (3) completed claim construction.

7. Attached as Exhibit 5 is a true and correct copy of the court's *Markman* order in the EDTX Action, filed at Dkt. 93 in the lead case *Super Interconnect Technologies LLC v. Huawei Device Co., Ltd.*, No. 2:18-cv-00462 (E.D. Tex.).

8. Attached as Exhibit 6 is a true and correct copy of the court's order filed on March 12, 2021, at Dkt. 111 in the lead case *Super Interconnect Technologies LLC v. Huawei Device Co., Ltd.*, No. 2:18-cv-00462 (E.D. Tex.), dismissing the EDTX Action.

9. Attached as Exhibit 7 is a true and correct copy of a redline comparing SIT's Complaint in the present action (Dkt. 1) with its first amended complaint in the EDTX Action.

10. Attached as Exhibit 8 is a true and correct copy of a subpoena for deposition testimony and document production served by SIT on Qualcomm Inc. in the EDTX Action.

11. The following Google employees were deposed as corporate witnesses for Google under Fed. R. Civ. P. 30(b)(6) in the EDTX Action: Madhav Chitlu, Michael Diamond, Nick Yoswa, Abhijit Ravi, James Maccoun, and Harleen Juneja.

12. Attached as Exhibit 9 is a true and correct copy of the cover pages of the transcript of the deposition of Madhav Chitlu in the EDTX Action.

13. Attached as Exhibit 10 is a true and correct copy of annotated excerpts of the deposition of Michael Diamond in the EDTX Action.

14. Attached as Exhibit 11 is a true and correct copy of the cover pages of the transcript of the deposition of Nicholas Yoswa in the EDTX Action.

15. Attached as Exhibit 12 is a true and correct copy of the cover of the transcript of the deposition of Abhijit Ravi in the EDTX Action.

16. Attached as Exhibit 13 is a true and correct copy of the cover of the transcript of the deposition of James Maccoun in the EDTX Action.

17. Attached as Exhibit 14 is a true and correct copy of the cover of the transcript of the deposition of Harleen Juneja in the EDTX Action.

18. Attached as Exhibit 15 is a true and correct copy of Harleen Juneja's LinkedIn profile, which indicates that she has left Google in January 2021 and is currently employed at Facebook in Menlo Park, in the San Francisco Bay Area.

19. Attached as Exhibit 16 is a true and correct copy of SIT's 2020 Texas Franchise Tax Public Information Report, filed on November 11, 2020, identifying SIT's mailing address as 6136 Frisco Square Blvd., Suite 400, Frisco, Texas.

20. Attached as Exhibit 17 is a true and correct copy of annotated excerpts from the deposition of Holly Hernandez in the EDTX Action.

21. Attached as Exhibit 18 is a true and correct copy of annotated excerpts from the deposition of Marc Booth in the EDTX Action.

22. Attached as Exhibit 19 is a true and correct copy of annotated excerpts from the deposition of Eric Lucas in the EDTX Action.

23. Attached as Exhibit 20 is a true and correct copy of annotated excerpts from the 2020 Form 10-K filed by Acacia Research Corporation with the Securities and Exchange Commission, indicating that Acacia Research Corporation's principal offices are at 4 Park Plaza Suite 550, Irvine, California.

24. Attached as Exhibit 21 is a true and correct copy of an Acacia Research Corporation webpage, last accessed April 5, 2021, identifying its subsidiary Acacia Research Group as "an industry leader in patent licensing" (https://acaciaresearch.com/actg/patent_licensing/3408/).

25. Attached as Exhibit 22 is a true and correct copy of excerpts from an email chain between myself and counsel for SIT in the EDTX Action, with the most recent email in the

chain, dated December 16, 2019, identifying the Rule 30(b)(6) topics assigned to Mr. Booth, Mr. Lucas, and Ms. Hernandez as SIT's corporate witnesses in the EDTX Action.

26. Attached as Exhibit 23 is a true and correct copy of Marc Booth's LinkedIn profile, which indicates that Mr. Booth is located in Newport Beach, California.

27. Attached as Exhibit 24 is a true and correct copy of Eric Lucas's LinkedIn profile, which indicates that Mr. Lucas is located in Laguna Beach, California.

28. Attached as Exhibit 25 is a true and correct copy of a Qualcomm Inc. ("Qualcomm") webpage, last accessed April 5, 2021, which indicates that Qualcomm has its headquarters at 5775 Morehouse Drive, San Diego, California (<https://www.qualcomm.com/contact>).

29. Attached as Exhibit 26 is a true and correct copy of annotated excerpts from the 2020 Form 10-K filed by Qualcomm with the Securities and Exchange Commission, indicating that Qualcomm's principal executive offices are at 5775 Morehouse Dr., San Diego, California.

30. In the EDTX Action, Qualcomm made its source code available [REDACTED]

[REDACTED] Attached as Exhibit 27 is a true and correct copy of annotated excerpts from an email chain between Freeda Lugo, counsel for Qualcomm in the EDTX Action, and myself, in which Ms. Lugo identifies [REDACTED] as holding Qualcomm's source code.

31. Attached as Exhibit 28 is a true and correct copy of Gyudong Kim's LinkedIn profile, which indicates that Gyudong Kim is an engineer at Analog Devices in the San Francisco Bay Area.

32. Attached as Exhibit 29 is a true and correct copy of annotated excerpts of the deposition of Gyudong Kim in the EDTX Action.

33. Attached as Exhibit 30 is a true and correct copy of Min-Kyu Kim's LinkedIn profile, which indicates that Min-Kyu Kim is an analog design engineering manager at Analog Devices, located in San Jose.

34. Attached as Exhibit 31 is a true and correct copy of the cover of the transcript of the deposition of Min-Kyu Kim in the EDTX Action.

35. Attached as Exhibit 32 is a true and correct copy of the declaration of Jaime Garcia, Contract Manager at Lattice Semiconductor Corporation ("Lattice"), dated October 31, 2019.

36. Attached as Exhibit 33 is a true and correct copy of a Lattice webpage, last accessed April 7, 2021, which shows that Lattice has its headquarters at 5555 NE Moore Ct, Hillsboro, Oregon, and maintains a Silicon Valley Development Center at 2115 O'Nel Drive, San Jose, California (<https://www.latticesemi.com/en/About>).

37. Attached as Exhibit 34 is a true and correct copy of excerpts of a subpoena served by Google on Lattice in the EDTX Action.

38. I performed a search for flights from San Francisco International Airport (SFO) to Waco Regional Airport (ACT). I identified no direct flights from SFO to ACT. The shortest travel time I identified from SFO to ACT requires two flights with a total flight time of 5 hours, 47 minutes, including a 1 hour, 2 minutes layover in Dallas/Fort Worth International Airport (DFW). Attached as Exhibit 35 is a true and correct copy of these search results.

39. I performed a search for flights from John Wayne Airport (SNA) and Los Angeles International Airport (LAX) to Waco Regional Airport (ACT). I identified no direct flights from

SNA to ACT or from LAX to ACT. The shortest travel time I identified from SNA to ACT requires two flights with a total flight time of 5 hours, 8 minutes, including a 1 hour, 12 minutes layover in DFW. The shortest travel time I identified from LAX to ACT requires two flights with a total flight time of 5 hours, 2 minutes, including a 1 hour, 2 minutes layover in DFW. Attached as Exhibit 36 is a true and correct copy of these search results.

40. I performed a search for flights from John Wayne Airport (SNA) to San Francisco International Airport (SFO). I identified eight nonstop daily flights, with travel times ranging from 1 hour, 25 minutes to 1 hour, 32 minutes. Attached as Exhibit 37 is a true and correct copy of these search results.

41. I performed a search for flights from San Diego International Airport (SAN) to San Francisco International Airport (SFO). I identified 18 nonstop daily flights, with travel times ranging from 1 hour, 25 minutes to 1 hour, 42 minutes. Attached as Exhibit 38 is a true and correct copy of these search results.

42. I performed a search for flights from San Diego International Airport (SAN) to Waco Regional Airport (ACT). I identified no direct flights from SAN to ACT. The shortest travel time I identified from SAN to ACT requires two flights with a total flight time of 4 hours, 50 minutes, including a 1 hour, 2 minutes layover in DFW. Attached as Exhibit 39 is a true and correct copy of these search results.

43. Attached as Exhibit 40 is a true and correct copy of a report from Docket Navigator showing the number of patent cases in the Northern District of California and the Western District of Texas in the 2019-20 time period.

44. Attached as Exhibit 41 is a true and correct copy of a report from Docket Navigator showing a comparison of the median time to trial between the Western District of Texas and the Northern District of California in the 2010-20 timeframe.

I declare under penalty of perjury that the foregoing is true and correct. Executed in San Francisco, California on April 27, 2021.

/s/ Mark Liang
Mark Liang



EXHIBIT 9



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HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

Transcript of Madhav Chitlu, Corporate Designee & Individually

Date: December 4, 2019

Case: Super Interconnect Technologies LLC -v- Huawei Device Co. Ltd., et al.

Planet Depos

Phone: 888.433.3767

Email: transcripts@planetdepos.com

www.planetdepos.com

WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

1 IN THE UNITED STATES DISTRICT COURT

2 FOR THE EASTERN DISTRICT OF TEXAS

3 MARSHALL DIVISION

4 - - - - -x

5 SUPER INTERCONNECT : Case No.

6 TECHNOLOGIES LLC, : 2:18-CV-00462

7 Plaintiff, :

8 v. :

9 HUAWEI DEVICE CO. LTD., HUAWEI :

10 DEVICE (HONG KONG) CO., LTD, :

11 AND HUAWEI DEVICE USA, INC., :

12 Defendant. :

13 - - - - -x

14
15 HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

16 Video Deposition of GOOGLE,

17 by and through its Designated Representative

18 MADHAV CHITLU

19 and in his personal capacity

20 Menlo Park, California

21 Wednesday, December 4, 2019

22 9:05 a.m.

23 Job No.: 276034

24 Pages: 1 - 108

25 Reported By: Charlotte Lacey, RPR, CSR No. 14224



EXHIBIT 10



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HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

Transcript of MicdahvDial onu, Corporath Dhsienhh g Inui&iuyaw

DathP December 44, 2041

CashP9 Suer p rert l l ecnoecTl t h l gi ssL GCv Sh a egDe-ge L t wsn wenHw

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El aiVPrH i crgn @uH en eut i wt m

www.pvanhtuhpos.col

WORsDWpDE LOURo REPORopNG & sppGAopON oEL v NOsOGY

1 IN THE UNITED STATES DISTRICT COURT

2 FOR THE EASTERN DISTRICT OF TEXAS

3 MARSHALL DIVISION

4 - - - - -x

5 SUPER INTERCONNECT : Case No.

6 TECHNOLOGIES LLC, : 2:18-CV-00462

7 Plaintiff, :

8 v. :

9 HUAWEI DEVICE CO. LTD., HUAWEI :

10 DEVICE (HONG KONG) CO., LTD, :

11 AND HUAWEI DEVICE USA, INC., :

12 Defendant. :

13 - - - - -x

14
15 HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

16 Video Deposition of GOOGLE,

17 by and through its Designated Representative

18 MICHAEL DIAMOND

19 and in his personal capacity

20 2765 Sand Hill Road

21 Menlo Park, California

22 Wednesday, December 11, 2019

23 9:01 a.m.

24 REPORTED BY:

25 Tammy Moon, CSR No. 13184, CRR, RPR

HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY
Transcript of Michael Diamond, Corporate Designee & Individually
Conducted on December 11, 2019

163

1 provided on site R&D support?

14:40:24

2 A. I'm not quite sure. So R&D is really broad,
3 right? [REDACTED]

14:40:27

14:40:46

14:40:48

14:40:51

4 [REDACTED]
5 [REDACTED]
6 Q. [REDACTED] I
7 don't think that R&D is encompassed by, hey, here
8 this is our next processor that's coming out and
9 it's going to be available on this day, do you?

14:40:51

14:40:56

14:41:00

14:41:02

10 A. It's part of it. It's certainly part of it.

14:41:04

11 Q. Okay.

14:41:08

14:41:09

14:41:12

14:41:16

14:41:19

14:41:21

14:41:26

14:41:28

14:41:30

14:41:33

14:41:41

14:41:49

14:41:54

14:41:57

14:42:03



EXHIBIT 11



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HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

Transcript of Nicholas Yoswa, Corporate Designee & Individually

Date: December 4, 20149

Case: Super Interconnect Technologies LLC -v- Huawei Device Co. Ltd.2et al.

Planet Depos

Phone: 888.3, , ., 767

Email: transcripts@planetdepos.com

www.planetdepos.com

1 IN THE UNITED STATES DISTRICT COURT

2 FOR THE EASTERN DISTRICT OF TEXAS

3 MARSHALL DIVISION

4 - - - - -x

5 SUPER INTERCONNECT : Case No.

6 TECHNOLOGIES LLC, : 2:18-CV-00462

7 Plaintiff, :

8 v. :

9 HUAWEI DEVICE CO. LTD., HUAWEI :

10 DEVICE (HONG KONG) CO., LTD, :

11 AND HUAWEI DEVICE USA, INC., :

12 Defendant. :

13 - - - - -x

14 HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

15 Video Deposition of GOOGLE,

16 by and through its Designated Representative

17 NICHOLAS YOSWA

18 and in his personal capacity

19 Menlo Park, California

20 December 13, 2019

21
22 Stenographically reported by:

23 JENNY L. GRIFFIN, RMR, CSR, CRR, CCRR, CRC

24 CSR No. 3969

25 Job No. 276787



EXHIBIT 12



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HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

Transcript of Abhijit Ravi, Corporate Designee & Individually

Date: December 4, 2019

Case: Super Interconnect Technologies LLC -v- Huawei Device Co. Ltd. et al.

Planet Depos

Phone: 888.3, , ., 767

Email: transcripts@planetdepos.com

www.planetdepos.com

WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

- - - - -x
SUPER INTERCONNECT : Case No.
TECHNOLOGIES LLC, : 2:18-CV-00462
Plaintiff, :
v. :
HUAWEI DEVICE CO. LTD., HUAWEI :
DEVICE (HONG KONG) CO., LTD, :
AND HUAWEI DEVICE USA, INC., :
Defendant. :

- - - - -x

HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY
Video Deposition of GOOGLE,
by and through its Designated Representative
ABHIJIT RAVI
and in his personal capacity
Menlo Park, California
Monday, December 23, 2019
9:04 a.m.

Job No.: 278553

Pages: 1 - 127

Reported By: Charlotte Lacey, RPR, CSR No. 14224



EXHIBIT 13



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HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

Transcript of James Maccoun, Corporate Designee

Date: December 4, 2019

Case: Super Interconnect Technologies LLC -v- Huawei Device Co. Ltd., et al.

Planet Depos

Phone: 888.377.7646

Email: transcripts@planetdepos.com

www.planetdepos.com

WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

-----x

SUPER INTERCONNECT :

TECHNOLOGIES LLC, :

Plaintiff, :

vs. : Case No.:

HUAWEI DEVICE CO. LTD., : 2:18-CV-00462

HUAWEI DEVICE (HONG :

KONG) CO., LTD, AND :

HUAWEI DEVICE USA, INC., :

Defendants. :

-----x

HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

Video Deposition of GOOGLE,
by and through its Designated Representative

JAMES MACCOUN

2765 Sand Hill Road

Menlo Park, California

Friday, December 6, 2019

9:02 a.m.

REPORTED BY:

Tammy Moon, CSR No. 13184, CRR, RPR



EXHIBIT 14



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HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

Transcript of Harleen Juneja, Corporate Designee & Individually

Date: December 4, 2019

Case: Super Interconnect Technologies LLC -v- Huawei Device Co. Ltd., et al.

Planet Depos

Phone: 888.433.3767

Email: transcripts@planetdepos.com

www.planetdepos.com

WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

-----x

SUPER INTERCONNECT :
TECHNOLOGIES LLC, :
Plaintiff, :

vs. : Case No.:

HUAWEI DEVICE CO. LTD., : 2:18-CV-00462

HUAWEI DEVICE (HONG :

KONG) CO., LTD, AND :

HUAWEI DEVICE USA, INC., :

Defendants. :

-----x

HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

Video Deposition of GOOGLE,

by and through its Designated Representative

HARLEEN JUNEJA

and in her personal capacity

2765 Sand Hill Road

Menlo Park, California

Wednesday, December 4, 2019

9:07 a.m.

REPORTED BY:

Tammy Moon, CSR No. 13184, CRR, RPR



EXHIBIT 17

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

SUPER INTERCONNECT)

TECHNOLOGIES LLC,)

Plaintiff,)

v.)

HUAWEI DEVICE CO. LTD.,)

ET AL)

_____)

GOOGLE LLC,)

Defendants.)

Civil Action No.

2:18-cv-00462-JRG

Civil Action No.

2:18-cv-00463-JRG

ORAL AND VIDEOTAPED DEPOSITION OF

HOLLY HERNANDEZ

AS 30(b)(6) FOR SUPER INTERCONNECT TECHNOLOGIES LLC

DECEMBER 19, 2019

1 A. Well, like I said, some months it's more than 09:25:28
2 others. [REDACTED] 09:25:31
3 [REDACTED]. 09:25:34
4 [REDACTED] 09:25:37
5 [REDACTED]. 09:25:40
6 Q. [REDACTED]. Correct? 09:25:41
7 A. [REDACTED] 09:25:44
8 Q. Frisco. So Acacia has an offense at Frisco 09:25:45
9 then? 09:25:52
10 A. Yes. 09:25:52
11 [REDACTED] 09:25:52
12 A. No. 09:25:56
13 Q. [REDACTED] 09:25:56
14 [REDACTED] 09:25:59
15 A. [REDACTED]. 09:25:59
16 Q. SIT's located in Austin. Is that right? 09:26:01
17 A. I don't believe it's located in Austin. 09:26:06
18 Q. Where do you believe it's located? 09:26:11
19 A. I believe the address is 6136 Frisco Square, 09:26:12
20 but I don't know for sure. 09:26:18
21 Q. [REDACTED] 09:26:20
22 [REDACTED] 09:26:25
23 A. [REDACTED] 09:26:27
24 Q. And that's also an Acacia address. Correct? 09:26:27
25 A. Correct. 09:26:30

Page 27

1 Q. Does SIT have any other addresses beyond the 09:26:30
2 Frisco address you identified? 09:26:38
3 A. No. 09:26:39
4 Q. So I would like to move on to another set of 09:26:40
5 topics. 09:27:07
6 So you mentioned before SIT is a subsidiary of 09:27:16
7 Acacia. Correct? 09:27:18
8 A. Correct. 09:27:19
9 Q. So I have some questions about Acacia. So how 09:27:20
10 would you describe Acacia's business? 09:27:24
11 A. Acacia is in the business of assisting 09:27:26
12 patentholders with monetizing their patent portfolios. 09:27:32
13 Q. And how does it do that? 09:27:35
14 A. It does it in various ways. I would say 09:27:37
15 mostly through licensing efforts. 09:27:42
16 Q. How many employees does Acacia have today? 09:27:43
17 A. [REDACTED]. 09:27:53
18 Q. [REDACTED] 09:28:00
19 [REDACTED]? 09:28:04
20 A. Correct. 09:28:05
21 Q. Where are these employees located? 09:28:06
22 A. [REDACTED] [REDACTED]
[REDACTED] [REDACTED] [REDACTED]
[REDACTED] [REDACTED] 09:28:18
25 Q. [REDACTED] [REDACTED] 09:28:19

1 have any type of formal title or role with SIT? 09:44:25

2 A. No. 09:44:28

3 Q. Does SIT have any -- strike that. 09:44:29

4 [REDACTED] 09:44:34

5 [REDACTED] 09:44:37

6 [REDACTED] 09:44:40

7 A. Not that I'm aware of. 09:44:43

8 Q. The four people you named, yourself -- well, 09:44:44

9 you're an attorney, but so the other [REDACTED] 09:44:51

10 [REDACTED] are they all attorneys? 09:44:55

11 A. No. 09:45:01

12 Q. Is Marc Booth an attorney? 09:45:01

13 A. No. 09:45:01

14 Q. Is Eric Lucas an attorney? 09:45:01

15 A. Yes. 09:45:01

16 Q. Is Li Yu an attorney? 09:45:03

17 A. No. 09:45:05

18 Q. Where are Mr. Booth, Lucas and Yu located? 09:45:06

19 A. They're located in Irvine. 09:45:14

20 Q. And we mentioned before SIT's located, to your 09:45:15

21 knowledge, in Frisco. Correct? 09:45:23

22 A. Correct. 09:45:24

23 Q. [REDACTED] 09:45:24

24 [REDACTED] 09:45:39

25 [REDACTED] [REDACTED] 09:45:43

Page 41

1 A. We are employed by Acacia Research Group. 09:45:45

2 Q. [REDACTED] 09:45:48

3 [REDACTED] [REDACTED] 09:45:51

4 A. [REDACTED] 09:45:52

5 Q. Why did SIT choose to form in Frisco in Texas? 09:45:52

6 MR. KIMBLE: Hold on a second. Caution 09:46:10

7 the witness not to reveal any attorney/client privileged 09:46:12

8 information or any work product information. 09:46:15

9 A. Right. Well, Acacia Research Group's 09:46:21

10 headquarters are in Frisco, Texas, and SIT is a 09:46:25

11 subsidiary of Acacia Research Group. So it made sense 09:46:29

12 to incorporate in Texas. Or form in Texas. It's not a 09:46:33

13 corporation. 09:46:36

14 Q. (BY MR. LIANG) Are Acacia Research Group's 09:46:39

15 other subsidiaries also based out of that same address 09:46:42

16 in Frisco, Texas? 09:46:45

17 A. I would say the vast majority of them are 09:46:46

18 based out of Frisco, Texas. 09:46:49

19 Q. How many subsidiaries is that, roughly? 09:46:51

20 A. Well, I mentioned there's approximately 100 09:46:52

21 subsidiaries. I would say 80 to 95 percent of them are 09:46:55

22 located in Frisco, Texas, but that's just a guess. 09:47:00

23 Q. So SIT is located in Frisco, Texas, but [REDACTED] 09:47:07

24 [REDACTED] are in Irvine, California. Is 09:47:12

25 that correct? 09:47:15

1 Correct? 11:42:44

2 MR. KIMBLE: Object to the form, also 11:42:44

3 beyond the scope. 11:42:47

4 A. I am not aware of any. 11:42:48

5 Q. (BY MR. LIANG) So just probably the last 11:42:50

6 question. So you said SIT is based in Frisco, Texas. 11:42:57

7 Correct? 11:43:05

8 A. Correct. 11:43:05

9 Q. So if the complaint in this case said it was 11:43:05

10 based in another location, the complaint would be wrong? 11:43:10

11 A. I believe so. 11:43:13

12 Q. And SIT was never based anywhere else other 11:43:15

13 than Frisco. Correct? 11:43:25

14 A. I believe so. 11:43:26

15 MR. LIANG: All right. Give me a couple 11:43:35

16 minutes off the record, and I'll just see if we have 11:43:37

17 anything else and I'll be done. 11:43:39

18 Do you expect to have a redirect or -- 11:43:42

19 MR. KIMBLE: One question. 11:43:43

20 MR. LIANG: Okay. 11:43:44

21 THE VIDEOGRAPHER: We're going off the 11:43:45

22 record at 11:44 a.m. 11:43:46

23 (Break from 11:44 a.m. to 11:54 a.m.) 11:44:11

24 THE VIDEOGRAPHER: We are going back on 11:54:26

25 the record at 11:55 a.m. 11:54:28



EXHIBIT 18

IN THE UNITED STATES DISTRICT COURT
FOR THE CENTRAL DISTRICT OF CALIFORNIA

)
)
SUPER INTERCONNECT TECHNOLOGIES,)
LLC,)
)
Plaintiff,)
v.)

) Civil Action No.
) 2:18-cv-00462-JRG
) LEAD CASE

)
)
GOOGLE LLC,)
)
Defendant.)

) Civil Action No.
) 2:18-cv-00463-JRG

VIDEO DEPOSITION OF MARC BOOTH
Newport Beach, California
Monday, December 23, 2019
Volume I

Reported by:
Gail E. Kennamer, CSR 4583, CCRR
Job No. 3804815

1 In the past few days, I suppose, Super Interconnect 09:19
2 has also de-designated Eric Lucas for Topics 12 and 25 and
3 redesignated Mr. Booth for those topics. Sorry. Let me
4 repeat that. They de-designated Eric Lucas for Topics 25
5 and 31 and redesignated Mr. Booth for those topics, and 09:19
6 they also want to designate Mr. Booth for Topic 12, in
7 addition to Eric Lucas; so both witnesses are designated
8 on that topic.

9 Google reserves its objections to those
10 re-designations which were made during or after the 09:19
11 deposition of Mr. Lucas, and all these topic designations
12 are subject to SIT's objections and responses, in response
13 to Google's 30(b)(6) Deposition Notice.

14 MR. BRAGALONE: That is correct.

15 And we also responded by email today regarding your 09:19
16 reservation of objection, and I won't restate that here.

17 But thank you. That is correct.

18 And in addition, we will want to read and sign both
19 for Mr. Lucas' and for Mr. Booth's deposition.

20 09:20

21 -EXAMINATION-

22

23 BY MR. LIANG:

24 Q. Let's begin.

25 Can you please state your full name for the record. 09:20

Page 8

1 A. Marc William Booth. 09:20

2 Q. Can you please state your work address?

3 A. [REDACTED] Irvine, California

4 [REDACTED]

5 Q. And what company that you work for is located at 09:20

6 that address?

7 A. Acacia Research Group.

8 Q. Any other companies you work for located at that

9 address?

10 A. Acacia Research Corporation also has a business, 09:20

11 place of business there.

12 Q. Is that office the headquarters for Acacia

13 Research Group?

14 A. Acacia Research Group is actually headquartered

15 in Texas. 09:20

16 Q. And what about Acacia Research Corporation, is

17 that the headquarters?

18 A. It's a Delaware corporation, but that's the main

19 office.

20 Q. So that is the main place of business of Acacia 09:21

21 Research Corporation?

22 A. Yes.

23 Q. As to Acacia Research Group, is that also the

24 main business location?

25 A. Yes. 09:21

1 Q. So Texas just meant the place where -- 09:21

2 A. That's where it's incorporated.

3 (Simultaneous speaking.)

4 THE REPORTER: You need for wait for each other

5 for the record. 09:21

6 BY MR. LIANG:

7 Q. You understand you're under oath today; correct?

8 A. Yes.

9 Q. Have you been deposed before?

10 A. Yes. 09:21

11 Q. How many times?

12 A. Roughly, six to eight.

13 Q. What was the subject matter of those prior

14 depositions?

15 A. Most of those were patent litigation matters. I 09:21

16 think there may have been one that was a contract dispute.

17 Q. What was generally the areas or topics that you

18 testified about?

19 A. They were similar to the ones I'm testifying

20 about today. 09:22

21 Q. Have you ever been deposed on behalf of the

22 plaintiff in this action, Super Interconnect Technologies?

23 A. Not yet, no.

24 Q. In those other depositions, were you testifying

25 on behalf of Acacia Research Group or another entity? 09:22

1 responsibilities in that capacity? 10:15

2 A. I now manage the entire IP assertion
3 organization; so all of the engineers, analysts report to
4 me, the licensing executives, the business development
5 organization, and the local finance and human resources. 10:15

6 Q. So your title chief IP officer, as well as some
7 of the titles you mentioned earlier, that was with Acacia
8 Research Group; correct?

9 A. Correct.

10 Q. Was it also with Acacia Research Corporation? 10:16

11 A. Yes, let me correct that.

12 So chief IP officer is Acacia Research Corporation
13 title.

14 Q. Do you hold any separate titles with Acacia
15 Research Group? 10:16

16 A. Yes. I'm the president and CEO of Acacia
17 Research Group.

18 Q. Now, do you hold any present position with the
19 plaintiff, SIT?

20 A. Yes. I'm the CEO. 10:16

21 Q. And what are your day-to-day responsibilities in
22 that capacity as CEO of SIT?

23 A. Well, day to day, there isn't a lot of activity
24 to be managed with SIT itself, but I oversee the overall
25 licensing effort essentially because it falls under me. 10:16

1 Q. So you have been the CEO since coming back to 10:19

2 Acacia in August 2018?

3 A. Essentially, yes.

4 Q. [REDACTED]

5 [REDACTED]

10:19

6 A. [REDACTED]

7 [REDACTED]

8 [REDACTED]

9 [REDACTED]

10 Q. [REDACTED]

11 [REDACTED]

12 A. Something like that, yes.

13 Q. Where is SIT's principal office located?

14 A. Its incorporated in Texas; in Plano, Texas --

15 I'm sorry. Dallas, Texas.

10:19

16 Q. Is that also where its main office is located?

17 A. Yes.

18 Q. In Dallas, Texas?

19 MR. BRAGALONE: The witness isn't designated on

20 this particular topic, but from his personal knowledge. 10:20

21 THE WITNESS: Yes. It's actually in Plano,
22 Texas. I was correct the first time.

23 BY MR. LIANG:

24 Q. And you're located in Irvine, California;

25 correct?

10:20

1 A. Correct. 10:20

2 Q. How often have you visited SIT's Plano office?

3 A. [REDACTED]

4 [REDACTED]

5 [REDACTED]

6 [REDACTED]

7 Q. [REDACTED]

8 [REDACTED]

9 A. [REDACTED]

10 Q. Does that office in Plano, is that also an 10:21

11 office for other Acacia entities and subsidiaries?

12 A. We have -- Yes, there are additional

13 subsidiaries incorporated there.

14 Q. Roughly, how many subsidiaries are incorporated

15 at that office? 10:21

16 A. I don't know. Dozens, probably. There are many

17 of them.

18 Q. Is that office in Plano also an office for

19 Acacia Research Group?

20 A. There is an Acacia Research Group employee 10:21

21 there, yes.

22 Q. Is that Holly Hernandez?

23 A. Correct.

24 Q. That's the only office for -- Strike that.

25 Does SIT have any other offices other than that 10:21

1 office in Plano? 10:21

2 A. Well, the office itself is actually located in
3 Frisco. It was located in Plano prior, and I think they
4 moved prior to me coming back, I believe they are now in
5 Frisco. 10:22

6 Q. So I want to restart a few of the questions,
7 then.

8 So that office in Frisco, that's also the office of
9 Acacia Research Group; correct?

10 A. Correct. 10:22

11 Q. It's also an office through which -- Strike
12 that.

13 It's also an office with the headquarters for dozens
14 of Acacia entities and subsidiaries; correct?

15 A. Correct. 10:22

16 Q. [REDACTED]

17 [REDACTED]

18 A. [REDACTED]

19 Q. [REDACTED]

20 [REDACTED]

10:22

21 A. Not since they moved from Plano, no.

22 Q. SIT has no other addresses; correct?

23 A. Correct.

24 Q. So it has no office in California, for example?

25 A. Well, no. The office in California is an Acacia 10:22

1 Research Group office. 10:23

2 Q. But is that an office of SIT?

3 A. [REDACTED]

4 Q. Are there other employees of Acacia -- of SIT --

5 Sorry. Strike that. Let's restart. 10:23

6 Are there other employees of SIT?

7 A. There are -- I'm the CEO.

8 Eric Lucas is the president.

9 I believe Holly's title is vice president.

10 [REDACTED] 10:23

11 Q. [REDACTED]

12 [REDACTED]

13 A. Correct.

14 Q. And Holly is located in Frisco; correct?

15 A. Correct. 10:23

16 Q. And you and Mr. Lucas are located in Irvine,

17 California; correct?

18 MR. BRAGALONE: Sorry. He said Lucas. Oh, he

19 said, "and Mr. Lucas." My apologies.

20 THE WITNESS: Yes, yes. Correct. 10:24

21 MR. LIANG: Let's take a break here. This is a

22 natural stopping point. We'll come back in a few minutes

23 or so.

24 VIDEO OPERATOR: We're going off the record.

25 The time 10:24. 10:24



EXHIBIT 19

IN THE UNITED STATES DISTRICT COURT
FOR THE CENTRAL DISTRICT OF CALIFORNIA

)
)
SUPER INTERCONNECT TECHNOLOGIES,)
LLC,)

Plaintiff,)

v.)

)
)
HUAWEI DEVICE CO. LTD., et al.,)

GOOGLE LLC,)

Defendant.)

) Civil Action No.
) 2:18-cv-00462-JRG
) LEAD CASE

) Civil Action No.
) 2:18-cv-00463-JRG

VIDEO DEPOSITION OF ERIC LUCAS
Newport Beach, California
Friday, December 20, 2019
Volume I

Reported by:

Gail E. Kennamer, CSR 4583, CCRR

Job No. 3804813

Pages 1 - 207

1 Then I went to Motorola. 09:39

2 Then I worked at Cambridge Display Technologies.

3 Then Boeing.

4 Then Alcatel.

5 Then I worked for a few smaller companies as a 09:40

6 licensing attorney.

7 Then I worked for Acacia for the last six or

8 six-and-a-half years. Most of those positions were in a

9 licensing capacity.

10 Q. So you mentioned working on patent or IP 09:40

11 licensing before Acacia; is that right?

12 A. Yes.

13 Q. What were those specific employers and

14 positions?

15 A. I believe every place I mentioned was a 09:40

16 licensing position.

17 Q. I see.

18 And when did you join Acacia?

19 A. I believe it was around March 2012 or

20 April 2012. 09:40

21 Q. And what was your title when you first joined

22 Acacia?

23 A. I believe it was senior vice president.

24 Q. What's your title today?

25 A. Senior vice president, licensing and litigation. 09:41

1 Q. You mentioned this at the beginning, but I just 09:41
2 want to confirm.

3 Are you a senior VP of Acacia Corporation or Research
4 Group?

5 A. Acacia Research Group. 09:41

6 Q. Do you hold any positions in any other Acacia
7 entities?

8 A. The subsidiaries, I do.

9 Q. What about Acacia Corporation?

10 A. I don't have a title there. 09:41

11 Q. In your role as senior VP of licensing at Acacia
12 Research Group, could you describe your responsibilities
13 and tasks?

14 A. Yeah. We are -- I'm responsible for helping to
15 evaluate portfolios that we're looking to purchase and 09:41
16 also financial litigation and try to license the patents
17 that we already own.

18 Q. Do you hold any positions with SIT?

19 A. I'm the president.

20 Q. And that role as president of SIT, what are your 09:42
21 day-to-day responsibilities?

22 A. I wouldn't say there are any day-to-day
23 responsibilities associated with that.

24 Q. Why do you say there's no day-to-day
25 responsibilities? 09:42

1 Q. So there are more employees at the subsidiary 09:49
2 Acacia Research Group than the parent Acacia Research
3 Corporation?

4 A. I believe so, yes.

5 Q. I just want to -- I think I may have skipped 09:49
6 this -- there are no SIT employees who are only employees
7 of SIT but not also SIT -- employees of Acacia Research
8 Group; correct?

9 A. I believe that's correct.

10 Q. [REDACTED]
11 [REDACTED] Where are they located?

12 A. [REDACTED]

13 [REDACTED]

14 Q. [REDACTED]
15 where are they located? 09:50

16 A. We have some people in Irvine, some people in
17 New York, [REDACTED] in Texas.

18 Q. How many are in Irvine?

19 A. [REDACTED]

20 Q. Now, SIT is located in Texas; right? 09:50

21 A. I didn't study the states of incorporation, but
22 I believe it may be incorporated in Texas.

23 Q. Could you tell me SIT's address right now?

24 A. No, I can't.

25 Q. Do you know what city they are located in? 09:51



EXHIBIT 22

Liang, Mark

From: Bill Kennedy <bkenedy@bcpc-law.com>
Sent: Tuesday, December 10, 2019 11:26 AM
To: Liang, Mark
Cc: mark@themannfirm.com; blake@themannfirm.com; #Google-SIT; Wesley Hill; Jon Rastegar; Jeffrey Bragalone; BCPCserv@bcpc-law.com; Jerry Tice; Justin Kimble
Subject: RE: SIT/Google - Deposition planning

[EXTERNAL MESSAGE]

Hi Mark,

Here are the specific topics for SIT's 30(b)(6) witnesses. Note the location change for the Newport depos, which is just around the corner from OMM's offices.

- Marc Booth
 - Dec. 23 at 9 a.m.
 - Stradling Yocca Carlson & Rauth, 660 Newport Center Drive, Suite 1600, Newport Beach, CA 92660
 - Topics 4, 6, 9, 10, 11, 17, 18, 19, 22, 23, 30, and 36 (to the extent it applies to Mr. Booth's other topics)
- Eric Lucas
 - Dec. 20 at 9 a.m.
 - Stradling Yocca Carlson & Rauth, 660 Newport Center Drive, Suite 1600, Newport Beach, CA 92660
 - Topics 7, 8, 12, 13, 14, 24, 25, 26, 27, 28, 31, and 36 (to the extent it applies to Mr. Lucas's other topics)
- Holly Hernandez
 - Dec. 19 at 9 a.m.
 - Bragalone Conroy PC, 2200 Ross Ave, Suite 4500-West, Dallas TX 75201
 - Topics 1, 2, 5, 33, 34, 35, and 36 (to the extent it applies to Ms. Hernandez's other topics)

SIT offers these witnesses subject to its previously served objections and responses. SIT reserves the right to amend these topic assignments.

BRAGALONE CONROY PC

T. William Kennedy

From: Liang, Mark <mliang@omm.com>
Sent: Monday, December 9, 2019 11:11 AM
To: Bill Kennedy <bkenedy@bcpc-law.com>
Cc: mark@themannfirm.com; blake@themannfirm.com; #Google-SIT <GoogleSIT@omm.com>; Wesley Hill <wh@wsfirm.com>; Jon Rastegar <jrastegar@bcpc-law.com>; Jeffrey Bragalone <jbragalone@bcpc-law.com>; BCPCserv@bcpc-law.com; Jerry Tice <jtice@bcpc-law.com>; Justin Kimble <jkimble@bcpc-law.com>
Subject: RE: SIT/Google - Deposition planning

Hi Bill,

Please send us topics for each of your witnesses today, or at least Holly Hernandez. The 19th works for Holly, but that assumes that her deposition will be short (less than 3-4 hours) based on your repeated representation to that effect.

We also assume Holly's deposition will be in Dallas at BCPC's offices, starting at 9am local time.

Thanks,

Mark Liang

mliang@omm.com



EXHIBIT 27

Liang, Mark

From: Freeda Lugo <flugo@mffmlaw.com>
Sent: Monday, December 9, 2019 11:10 AM
To: Liang, Mark
Cc: David Kays; Donn Waslif
Subject: RE: Super Interconnect Tech. v. Huawei/Qualcomm's Response to subpoena

[EXTERNAL MESSAGE]

Hi Mark,

Yes, confirmed. We'll make a tentative reservation [REDACTED] until the paperwork is finalized, and he can go ahead and make his travel plans. He will receive a formal confirmation [REDACTED]

[REDACTED] Los Angeles, CA [REDACTED] between the hours of 9AM – 4:30PM.

Thanks,
Freeda

From: Liang, Mark <mliang@omm.com>
Sent: Monday, December 9, 2019 9:25 AM
To: Freeda Lugo <flugo@mffmlaw.com>
Cc: David Kays <dkays@mffmlaw.com>; Donn Waslif <dwaslif@mffmlaw.com>
Subject: RE: Super Interconnect Tech. v. Huawei/Qualcomm's Response to subpoena

Hi Freeda,

Could you please confirm this morning that our source code expert can make a visit to the [REDACTED] in LA on 12/11-13? Your email indicated that we could make an inspection starting on 12/11, but I'd like to confirm that we have a reservation, so [REDACTED]

Mark Liang

mliang@omm.com

O: +1-415-984-8882

M: +1-773-398-2871

O'Melveny

O'Melveny & Myers LLP

Two Embarcadero Center, 28th Floor

San Francisco, CA 94111

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From: Liang, Mark
Sent: Saturday, December 7, 2019 2:45 PM
To: 'Freeda Lugo' <flugo@mffmlaw.com>



EXHIBIT 29

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

---oOo---

SUPER INTERCONNECT TECHNOLOGIES,
LLC

Plaintiff,

vs.

No. 2:18-cv-0462-JRG
Lead Case

HUAWEI DEVICE CO., LTD., et al.,
Defendants.

_____/

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF TEXAS
DALLAS DIVISION

---oOo---

SUPER INTERCONNECT TECHNOLOGIES,
LLC

Plaintiff,

vs.

No. 3:18-cv-02932-M

ZTE CORPORATION and ZTE USA,
INC.,

Defendants.

_____/

VIDEOTAPED DEPOSITION OF GYUDONG KIM
PALO ALTO, CALIFORNIA
WEDNESDAY, AUGUST 21, 2019

REPORTED BY:
ANDREA M. IGNACIO,
CSR, RPR, CRR, CCRR, CLR
California CSR No. 9830
Job No. 3485463
Pages 1 - 236

1 defendant Google LLC. With me, joining by phone, is 09:02

2 Boris Mindzak, also of O'Melveny & Myers, representing 09:02

3 defendant Google LLC. 09:02

4 MR. UPSHAW: Edward Upshaw of Upshaw PLCC, 09:02

5 representing defendant ZTE USA, Inc. 09:02

6 MR. KENNEDY: Bill Kennedy from Bragaline 09:02

7 Conroy PC, representing plaintiff, Super Interconnect 09:02

8 Technologies LLC. 09:02

9 MR. JAKOPIN: David Jakopin from Pillsbury, 09:03

10 Winthrop, Shaw, Pitman representing the witness, 09:03

11 Gyudong Kim. 09:03

12 THE WITNESS: Gyudong Kim at Invecas. 09:03

13 THE VIDEOGRAPHER: Thank you. 09:03

14 THE WITNESS: I don't know what to say, 09:03

15 but... 09:03

16 THE VIDEOGRAPHER: You can swear the witness. 09:03

17 09:03

18 GYUDONG KIM,

19 having been sworn as a witness,

20 by the Certified Shorthand Reporter,

21 testified as follows:

22

23 EXAMINATION

24 BY MR. LIANG:

25 Q Please state your full name for the record. 09:03

1 A Gyudong Kim. 09:03

2 Do you need the spelling? 09:03

3 Q I think it's correct on the transcript, so 09:03

4 it's fine. 09:03

5 A Okay. 09:03

6 Q Where is your work address? 09:03

7 A Hang on. I need to check. I think it is 09:03

8 3385, but we'll make sure. 09:03

9 Q While -- while you're checking for that, do 09:03

10 you know your home address? 09:04

11 A Yeah. [REDACTED] 09:04

12 Q Okay. 09:04

13 A [REDACTED] California [REDACTED] 09:04

14 Q I'll just move on to the next question. 09:04

15 A Okay. 09:04

16 Q You understand you're under oath today? 09:04

17 A Yeah -- 09:04

18 Q And have -- 09:04

19 A -- I was told. 09:04

20 Q And have you been deposed before? 09:04

21 A I have been to a deposition place, but I did 09:04

22 not do the deposition then, so this is my first 09:04

23 deposition. 09:04

24 Q Okay. So I'll just -- in light of that, I'll 09:04

25 provide a brief, just, summary of how this deposition 09:04

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

SUPER INTERCONNECT
TECHNOLOGIES LLC,

Plaintiff,

vs.

GOOGLE LLC,

Defendant.

Civil Action No. 6:21-cv-259-ADA

JURY TRIAL DEMANDED

**DECLARATION OF ANDRE GOLUEKE REGARDING GOOGLE LLC'S MOTION TO
TRANSFER VENUE TO THE NORTHERN DISTRICT OF CALIFORNIA**

I, Andre Golueke, declare and state as follows:

1. I am a Discovery Manager on the Discovery Legal team at Google LLC (“Google”). I have been a Google employee since 2011. My office is in [REDACTED] California.
2. I provide this declaration in support of Google LLC’s Motion to Transfer Under 28 U.S.C. § 1404(a), which seeks to transfer the above-captioned action filed by Super Interconnect Technologies LLC (“SIT”) on March 15, 2021. I am over 18 years of age and have personal knowledge of the facts set forth in this Declaration. If called as a witness, I could and would testify competently to the information contained herein.
3. Google’s Mountain View headquarters, which includes offices in neighboring Sunnyvale (collectively referred to as “Mountain View”), is the strategic center of Google’s business. On March 15, 2021, the Mountain View headquarters employed approximately [REDACTED] employees, which is approximately [REDACTED]% of Google’s U.S. employees. As of March 15, 2021, Google also had approximately [REDACTED] other employees in offices in San Francisco, California and other smaller offices also within the Northern District of California. As of March 15, 2021, approximately [REDACTED]% of Google’s [REDACTED] total U.S. employees, including engineers, product managers, marketers, executives, and staff were employed out of Google’s offices located in the Northern District of California.
4. I understand that the Plaintiff accuses certain Google Pixel series smartphones (hereinafter, “Pixel Products”), and in particular their Universal Flash Storage (UFS) capabilities, as allegedly infringing.
5. Based on my knowledge and investigation, the Google employees who have knowledge about the technical, financial, and marketing aspects of the accused Pixel Products

live and work in the San Francisco Bay Area. In particular, the engineers and groups with knowledge relating to the accused Universal Flash Storage (UFS) interfaces in the accused Pixel Products live and work in or near Mountain View.

6. Based on my knowledge and investigation, Michael Diamond is a staff hardware engineer at Google and works as the engineering manager of the Mountain View-based system integration team for accused Pixel Products. I understand that Mr. Diamond [REDACTED] works at Google's Mountain View headquarters. I understand that Mr. Diamond has knowledge regarding technical aspects of accused Pixel Products, including their circuit board design and UFS interfaces.

7. Based on my knowledge and investigation, Madhav Chitlu is a memory commodity and supply manager working at Google. I understand that Mr. Chitlu [REDACTED] works at Google's Mountain View headquarters. I understand that Mr. Chitlu has knowledge regarding Google's business relationship with suppliers of memory and storage components for the accused Pixel Products.

8. Based on my knowledge and investigation, the marketing efforts for the accused Pixel Products are also managed by employees located at Google's Mountain View headquarters.

9. Based on my knowledge and investigation, Abhijit Ravi is Google's Head of Product Marketing for Pixel phones. I understand that Mr. Ravi [REDACTED] works at Google's Mountain View headquarters. I understand that Mr. Ravi has knowledge about marketing, promotion, and business information regarding the accused Pixel Products.

10. Based on my knowledge and investigation, Nick Yoswa is a senior financial analyst in the Pixel business unit. I understand that Mr. Yoswa [REDACTED]

works at Google's Mountain View headquarters. I understand that Mr. Yoswa has knowledge regarding financial data and statements, accounting, and record-keeping related to the accused Pixel Products.

11. Based on my knowledge and investigation, James Maccoun is a patent counsel at Google. I understand that Mr. Maccoun works at Google's Mountain View headquarters. I understand that Mr. Maccoun has knowledge regarding Google's license agreements and licensing practices.

12. Based on my knowledge and investigation, I am not aware of any Google employees with relevant technical, marketing, or financial knowledge regarding the accused Pixel Products who reside or work in the Western District of Texas, including in Google's offices in Austin, or anywhere else in Texas.

13. As a matter of Google practice, documents in Google's possession about its products and services are normally created and maintained by the employees working on those products and services. As discussed above, the employees with relevant knowledge of the accused features of the Pixel Products are located primarily in or around Mountain View, California, and no such employees are in the Western District of Texas.

I declare under penalty of perjury that to the best of my knowledge the foregoing is true and correct. Executed on April 22, 2021, in

Andre Golueke

Andre Golueke

EXHIBIT 2

FOR THE EASTERN DISTRICT OF TEXAS

SUPER INTERCONNECT)
TECHNOLOGIES LLC,)

Plaintiff,)

Civil Action No. 2:18-cv-00463-JRG

V.)

GOOGLE LLC,)

Defendant.)

REDACTED

JURY TRIAL DEMANDED

DEFENDANT GOOGLE LLC’S MOTION TO DISMISS FOR IMPROPER VENUE
UNDER RULE 12(B)(3) AND 28 U.S.C. § 1406

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I. INTRODUCTION

Venue as to Defendant Google LLC (“Google”) is improper under the Supreme Court’s decision in *TC Heartland LLC v. Kraft Foods Group Brands LLC*, which established that venue in a patent case exists only (1) where the defendant is incorporated or (2) in a district in which the defendant has a regular and established place of business and has committed acts of infringement. 137 S. Ct. 1514 (2017). Today and at the filing of the Complaint, Google was incorporated in Delaware, with its headquarters and principal place of business in California. Google does not have any real estate, offices, or any other real property in this District, much less one that qualifies as “regular and established” under the standards that the Federal Circuit set forth in *In re Cray Inc.*, 871 F.3d 1355, 1360 (Fed. Cir. 2017).

The only “place of business” alleged in Plaintiff Super Interconnect LLC’s (“SIT”) Complaint are Google Global Cache (“GGC”) servers located in this District. But GGC servers do not qualify as regular and established place of business because they are: (a) merely computers, not physical facilities, real property, or places; (b) not used for conducting “business”; (c) manufactured and sold by third parties; and (d) located, installed, hosted, and managed by third parties. Google recognizes that this Court previously found venue proper as to Google based on the GGC servers and that the Federal Circuit denied Google’s mandamus petition challenging the Court’s decision. *SEVEN Networks, LLC v. Google LLC*, 315 F. Supp. 3d 933 (E.D. Tex. 2018); *In re Google LLC*, No. 2018-152, 2018 WL 5536478 (Fed. Cir. Oct. 29, 2018). But the Federal Circuit’s denial was on purely procedural grounds—it expressly declined to reach the merits of this Court’s order and the issue of whether GGC servers constitute a “regular and established place of business.” *In re Google LLC*, 2018 WL 5536478, at *2.

Moreover, both before and after this Court’s decision, other courts in the Fifth Circuit have reached the opposite conclusion. Before this Court’s decision, Judge Clark found GGC servers to

be “hardware” or “electronic equipment,” not “places” as required under the venue statute and thus insufficient to establish venue as to Google in this District. *Personal Audio, LLC v. Google, Inc.*, 280 F. Supp. 3d 922, 934 (E.D. Tex. 2017). After this Court’s decision in *SEVEN* and the Federal Circuit’s subsequent mandamus decision, the Northern District of Texas noted the conflict in this District between *SEVEN* and *Personal Audio* and agreed with Judge Clark, finding that computer servers are not a “regular and established place of business.” Ex. A, *CUPP Cybersecurity, LLC, v. Symantec Corp.*, C.A. No. 3:18-CV-01554, D.I. 53 at *6 (N.D. Tex. Dec. 21, 2018). Accordingly, Google respectfully moves to dismiss this action for improper venue.

II. STATEMENT OF ISSUES TO BE DECIDED BY THE COURT (L.R. CV-7(A)(1))

Whether this action should be dismissed under Fed. R. Civ. P. 12(b)(3) and 28 U.S.C. § 1406(a) for improper venue as to Google in this District.

III. PROCEDURAL HISTORY AND FACTUAL BACKGROUND

A. SIT’s Complaint, Parallel Actions, And The *SEVEN* Appeal

SIT filed its Complaint initiating this action on November 2, 2018, alleging infringement of three patents: U.S. Patent Nos. 6,463,092 (“’092 Patent”); 7,158,593 (“’593 Patent”); 7,627,044 (“’044 Patent”) (collectively “Patents-in-Suit”). D.I. 1. SIT alleges that Google infringes because its Pixel smartphones include processor and memory chips that comply with industry standards published by the JEDEC and MIPI standards organizations. *Id.* at ¶¶15-17, 30-32, 44-46.

SIT’s action against Google is one of seven pending actions that SIT filed on November 2. Four of the actions are pending in Delaware before Judge Connolly, and another is in the Northern District of Texas before Judge Lynn. All seven actions, listed below, allege infringement of the same three Patents-in-Suit based on the same theory that each defendant’s products include processor and memory chips that comply with the same JEDEC and MIPI standards.

1. *Super Interconnect Techs. LLC v. Lenovo Group Ltd.*, No. 1:18-cv-01729 (D. Del.)
2. *Super Interconnect Techs. LLC v. Motorola Mobility, LLC*, No. 1:18-cv-01730 (D. Del.)
3. *Super Interconnect Techs. LLC v. Sony Corp.*, No. 1:18-cv-01731 (D. Del.)
4. *Super Interconnect Techs. LLC v. HP Inc.*, No. 1:19-cv-00169 (D. Del.)¹
5. *Super Interconnect Techs. LLC v. ZTE Corp.*, No. 3:18-cv-02932 (N.D. Tex.)
6. *Super Interconnect Techs. LLC v. Huawei Device Co.*, No. 2:18-cv-00462 (E.D. Tex.)
7. *Super Interconnect Techs. LLC v. Google LLC*, No. 2:18-cv-00463 (E.D. Tex.) (this action)

In its Complaint in this action, SIT’s sole basis for alleging venue is Google’s GGC servers located in this District and the Federal Circuit’s decision denying Google’s mandamus petition challenging this Court’s decision in *SEVEN*. *Id.* at ¶5.

But in denying mandamus relief, the Federal Circuit did not affirm this Court’s order or otherwise find venue proper based on the GGC servers. Instead, the Federal Circuit expressly declined to reach the merits of the issue because, in its view, whether GGC servers constitute a “regular and established place of business” did not rise to the level of a “special circumstance[]” justifying mandamus review of certain basic, unsettled, recurring legal issues over which there is considerable litigation producing disparate results.” *In re Google LLC*, 2018 WL 5536478, at *2. The Federal Circuit concluded that it would let the issue of whether GGC servers constitute a “regular and established place of business” “percolate in the district courts so as to more clearly

¹ On November 2, 2018, SIT filed an action against HP, Inc. in the District of Delaware, but then voluntarily dismissed that action the same day. *Super Interconnect Techs. LLC v. HP Inc.*, No. 1:18-cv-01728 (D. Del.). On January 29, 2019, SIT re-filed the action against HP in Delaware, and the action is now pending before Judge Connolly.

define the importance, scope, and nature of the issue for us to review.” *Id.* at *3. The Federal Circuit also did not decide the separate issue of whether there must be a “relationship between the ‘regular and established place of business’ requirement and the ‘acts of infringement’ requirement” in § 1400(b), because that issue, while unsettled, was “insufficient to show a ‘clear and indisputable’ right to support mandamus.” *Id.*

The Federal Circuit’s denial was not unanimous. Judge Reyna filed a dissenting opinion, stating that “Google and *amici* have raised significant questions as to whether the district court’s ruling disregards” the venue standards set forth in *Cray*, and “[i]t seems to me that under *Cray*, Google’s servers or the server racks on which the servers are kept may not constitute a ‘regular and established place of business.’” *Id.* at *5. Judge Reyna also highlighted the “far-reaching implications of the district court’s ruling,” under which “a company could potentially become subject to venue in any judicial district in which a physical object belonging to the company was located.” *Id.* at *6.

B. Google And The GGC Servers

Google’s briefing before the Federal Circuit and this Court in *SEVEN* presented a number of undisputed facts about Google and the GGC servers. These facts were unchanged at the time when SIT filed its Complaint on November 2 and are summarized below.

Google is a Delaware corporation founded in Mountain View, California and has been headquartered there since 2004. Durbin Decl. ¶¶4-5. When SIT filed its Complaint: (1) Google did not (and still does not) own or lease any office space, retail space, or other real property in the Eastern District of Texas; (2) Google had (and has) no employees who work at any Google offices in this District; and (3) Google’s only Texas offices were (and are) located in Austin, San Antonio and Dallas (Addison), cities outside this District. Lim Decl. ¶¶3-4; Durbin Decl. ¶6.

The GGC servers, meanwhile, are just one part of a tiered network of computer infrastructure that Google uses to deliver content to Internet users. The core of this network is Google’s data centers, which provide computation and backend storage. McCallion Decl. ¶3. There are a handful of Google data centers in the U.S., none of which are in Texas. *Id.*; Lim Decl. ¶5. The next tier of Google’s network infrastructure is known as “Edge Points of Presence” (“PoPs”), which connect Google’s network to the rest of the Internet. McCallion Decl. ¶4. Google has no PoPs in the Eastern District of Texas. *Id.*

The last tier of the network is the GGC servers or “edge nodes.” *Id.* ¶5. GGC servers are computers hosted at the facilities of local Internet Service Providers (“ISP”). *Id.* ¶6. Copies of certain digital content (e.g., videos) popular with the ISP’s subscribers can be temporarily stored or “cached” on those GGC servers. *Id.* GGC servers and their caching function are not necessary for the delivery of Google content to users; instead, caching merely allows for faster delivery of popular content. *Id.*

GGC servers are computers manufactured and shipped to ISPs by third parties. *Id.* ¶¶6, 8. After receiving the GGC servers, the ISP unpacks, locates, installs, and hosts them in its own facility. *Id.* ¶8. Google does not own, lease, or control the space where the servers are kept. *Id.* ¶9. No Google employee has ever seen or visited the servers in this District. *Id.* [REDACTED]

[REDACTED]

[REDACTED]

IV. VENUE IS NOT PROPER IN THE EASTERN DISTRICT OF TEXAS

“[U]pon motion by the Defendant challenging venue in a patent case, the Plaintiff bears the burden of establishing proper venue.” *In re ZTE (USA) Inc.*, 890 F.3d 1008, 1013 (Fed. Cir. 2018). In a patent case, venue lies only “[1] in the judicial district where the defendant resides, or [2] where the defendant has committed acts of infringement and has a regular and established place

of business.” 28 U.S.C. § 1400(b). SIT cannot meet its burden in establishing proper venue over Google in this District under either prong of § 1400(b).

A. Google Does Not Reside In This District

A domestic corporate defendant, like Google, “resides” only in its state of incorporation. *TC Heartland*, 137 S. Ct. at 1521. Venue is assessed as of the time of filing of the complaint. *E.g.*, *Raytheon Co. v. Cray, Inc.*, 258 F. Supp. 3d 781, 787 (E.D. Tex. 2017). When this action was filed and now, Google was incorporated in Delaware. Durbin Decl. ¶5. Thus, Google’s residence cannot provide a basis for venue in this District.

B. SIT Cannot Show that Google Has A “Regular And Established Place of Business” In This District Under *Cray*’s Three Factor Test

In *Cray*, the Federal Circuit set forth three factors that must be satisfied for a defendant to be deemed to have a regular and established place of business: “(1) there must be a physical place in the district; (2) it must be a regular and established place of business; and (3) it must be the place of the defendant.” 871 F.3d at 1360. The *only* connection between Google and this District that SIT points to is the GGC servers. But the GGC servers do not qualify as “regular and established places of business” under *Cray*’s three-factor test.

1. Cray Factor 1: GGC Servers Are Not “Physical Places Of Business”

A GGC server is not a “physical place of business,” such as “a building or a part of a building,” but is instead a piece of hardware or equipment. Ex. B, *BMC Software, Inc. v. Cherwell Software, LLC*, No. 1:17-cv-1074, D.I. 55 at 4 (E.D. Va. Dec. 21, 2017) (“Servers are not real property; they are personal property,” and thus not places of business for venue). Before this Court’s decision in *SEVEN*, Judge Clark in *Personal Audio* found venue improper as to Google in this District. 280 F. Supp. 3d 922. In reaching his conclusion, Judge Clark found GGC servers insufficient to establish venue because they are “‘hardware,’ the physical electronic equipment

used to operate the internet,” as opposed to “‘places’ under the meaning of the statute.” *Id.* at 934. Recently—after this Court’s decision *SEVEN* and the Federal Circuit’s subsequent mandamus denial—Judge Lynn of the Northern District of Texas reached a similar result in *CUPP Cybersecurity*, concluding that a defendant’s servers at a third-party’s data center in Dallas were not a “regular and established place of business.” Ex. A at *6. In so concluding, Judge Lynn considered the conflicting authority between *SEVEN* and *Personal Audio* in this District and the Federal Circuit’s mandamus decision in *SEVEN*. *Id.* at *4-5. Judge Lynn agreed with *Personal Audio*, citing its reasoning to conclude that “servers are not a building or a part of a building,” but instead “are ‘hardware,’ the physical electronic equipment used to operate the internet or an intranet.” *Id.* at *4-6.

Even if the GGC servers could be considered “physical places,” they are not “places of business.” Servers are pieces of equipment, like slot machines or vending machines, and do not rise to the level of being places of business, such as an office, storefront, or factory where staff work. *HomeBingo Network, Inc. v. Chayevsky*, 428 F. Supp. 2d 1232, 1250 (S.D. Ala. 2006) (“That an individual may be a part owner of a piece of equipment (in this case, a slot machine) located in a judicial district does not render the situs of that equipment his regular and established place of business for venue purposes.”); *Magee v. Coca-Cola Refreshments USA, Inc.*, 833 F.3d 530, 534 (5th Cir. 2016) (finding that “vending machines are not ‘sales establishments,’” and defining “establishment” as “a place of business or residence with its furnishings and staff”) (internal quotations omitted). As the court in *Personal Audio* found:

To conclude that Google’s business was being carried out by these servers would have far-reaching consequences that distort the scope of the statute; for example, every single AT&T tower would then possibly become a place of business for AT&T. Maybe even every handheld device sold by Verizon would become a place of business for Verizon because the end-user signed an agreement with Verizon regarding Verizon’s exclusive control of the device.

280 F. Supp. 3d at 934. Judge Lynn in *CUPP Cybersecurity* similarly concluded that servers, which handle internet “traffic,” “are not places from which [defendant] conducts its business.” Ex. A at *6.

In *SEVEN*, this Court likened Google’s GGC servers to warehouses. 315 F. Supp. 3d at 948. But unlike the GGC servers, a warehouse is real property staffed by employees of the business. A closer analogy for a GGC server, which temporarily “caches” popular content for users, would be a storage locker. But courts have found storage lockers do not qualify as places of business for purposes of venue. *Regents of Univ. of Minn. v. Gilead Scis., Inc.*, 299 F. Supp. 3d 1034, 1043 (D. Minn. 2017) (“The Court is not persuaded that these relatively small storage lockers . . . constitute a sufficiently regular and established physical foothold of Gilead in Minnesota.”); *CDx Diagnostic, Inc. v. U.S. Endoscopy Grp., Inc.*, No. 13-CV-5669(NSR), 2018 WL 2388534, at *3 (S.D.N.Y. May 24, 2018) (storage units were not a “place of business” under Section 1400(b) because “no employee or agent of Defendant actually conducts business at the storage units”) (internal quotations omitted).

2. ***Cray* Factor 2: GGC Servers Are Not “Regular And Established”**

As the Federal Circuit explained in *Cray*, a “regular and established” place must be “settle[d] certainly, or fix[ed] permanently.” 871 F.3d at 1363 (quoting Black’s Law Dictionary (1st ed. 1891)). [REDACTED]

[REDACTED] The storage of personal property on the shelf of a third party pursuant to an agreement that can be terminated at any time for any reason is not enough to establish that the GGC servers in this District are “fix[ed] permanently.” *Cray*, 871 F.3d at 1363

3. ***Cray* Factor 3: GGC Servers Do Not Belong To Google**

To satisfy the third factor, the “defendant must establish or ratify the place of business” in question. *Cray*, 871 F.3d at 1363. “Relevant considerations include whether the defendant owns or leases the place, or exercises other attributes of possession or control over the place.” *Id.*

Here, the ISPs’ facilities where GGC servers are located do not belong to Google, nor does Google lease the facilities. McCallion Decl. ¶9. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Other “[p]otentially relevant inquiries” in assessing the third factor “include whether the defendant lists the alleged place of business on a website, or in a telephone or other directory; or places its name on a sign associated with or on the building itself.” *Cray*, 871 F.3d at 1363-64. Google has done none of those things. There is no Google “sign” or other indication on any ISP facility that the facility is affiliated with Google. This consideration confirms that the GGC servers are not a “place of business” of Google and cannot provide a basis for venue.

C. SIT Cannot Show That Google’s Alleged Acts Of Infringement In This District Are Tied To Any “Regular And Established Place Of Business”

The issue of whether § 1400(b)’s two requirements—“acts of infringement” and “regular and established place of business”—must be tied to establish venue has not been decided by the Federal Circuit. Before the Federal Circuit broadened the scope of the venue statute in 1990 in *VE Holding Corp. v. Johnson Gas Appliance Co.*, 917 F.2d 1574 (Fed. Cir. 1990), which *TC Heartland* abrogated in 2017, district courts had held that “there must be some reasonable or significant relationship between the accused item and any regular and established place of business

of the accused in the judicial district.” *Scaramucci v. FMC Corp.*, 258 F. Supp. 598, 602 (W.D. Okla. 1966); *Jeffrey Galion, Inc. v. Joy Mfg. Co.*, 323 F. Supp. 261, 266-67 (N.D. W. Va. 1971). Thus, under these decisions, § 1400(b)’s two requirements must be tied to establish venue.

Here, SIT’s accusations bear no relationship to this District or the GGC servers. SIT’s Complaint alleges infringement based on features of memory and processor chips that are *inside* Pixel smartphones. D.I. 1 at ¶¶12, 27, 42. By contrast, the GGC servers are computers that are part of Google’s vast, nationwide network infrastructure and are used to temporarily cache digital web content for delivery to Internet users. Thus, venue is improper in this District for the additional reason that the acts of infringement alleged in SIT’s Complaint are not tied or related to any purported “regular and established place of business” of Google as required by § 1400(b).

V. CONCLUSION

Because Google does not have a “regular and established place of business” in this District under *TC Heartland* and *Cray*, Google respectfully requests that the Court dismiss this action for improper venue.

DATED: February 4, 2019

By: /s/ J. Mark Mann

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that all counsel of record who are deemed to have consented to electronic service are being served with a copy of this document on 4th day of February, 2019.

/s/ J. Mark Mann

J. Mark Mann

CERTIFICATE OF AUTHORIZATION TO FILE UNDER SEAL

I certify that the foregoing document is being filed under seal pursuant to Local Rule CV-5(a)(7)(C) which requires that a Motion to Seal be filed immediately prior hereto.

/s/ Mark Liang

Mark Liang

EXHIBIT 3

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

**SUPER INTERCONNECT
TECHNOLOGIES LLC,**

Plaintiff,

v.

GOOGLE LLC,

Defendant.

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**CIVIL ACTION NO. 2:18-CV-00463-JRG
(MEMBER CASE)**

**CIVIL ACTION NO. 2:18-CV-00462-JRG
(LEAD CASE)**

MEMORANDUM OPINION AND ORDER

On November 2, 2018, Plaintiff Super Interconnect Technologies, LLC (“SIT”) sued Defendant Google, LLC (“Google”) for patent infringement in this District. (Dkt. No. 1.)¹ Google moves to dismiss the complaint for improper venue under Federal Rule of Civil Procedure 12(b)(3) and 28 U.S.C. § 1406 (the “Motion”). (Dkt. No. 13.) Having considered the Motion, briefing, and relevant authorities, the Court **DENIES** the Motion for the reasons discussed herein.

“Any civil action for patent infringement may be brought in any judicial district where the defendant resides, or where the defendant has committed acts of infringement and has a regular and established place of business.” 28 U.S.C. § 1400(b). SIT alleges that venue is proper under the second prong of § 1400(b):

5. Venue is proper in this judicial district under 28 U.S.C. § 1400(b) because Google has committed acts of infringement in the District and has a regular and established place of business in this District. On information and belief, multiple ISPs host Google Global Cache servers in this District, which cache Google’s products and deliver them to residents of this District. These Google Global Cache servers cache content that includes video advertising, apps, and digital content from the Google Play store, among other things. Google generates revenue by providing

¹ Unless otherwise noted, all docket citations are to *Super Interconnect Technologies, LLC v. Google, LLC*, No. 2:18-cv-00463 (E.D. Tex.).

these services to residents of this District. Both the server itself and the place of the Google Global Cache server, independently and together, constitute a “physical place” and a “regular and established place of business” of Google. The Federal Circuit very recently denied mandamus to Google where it challenged this Court’s ruling that venue was proper over it under 28 U.S.C. § 1400(b). *See In re Google LLC*, No. 2018-152, 2018 WL 5536478 (Fed. Cir. Oct. 29, 2018).

(Dkt. No. 1 ¶ 5.)

Google argues that its Google Global Cache (“GGC”) servers do not qualify as a “regular and established place of business” under the Federal Circuit’s three-part test in *In re Cray*, 871 F.3d 1355, 1360 (Fed. Cir. 2017). (Dkt. No. 13 at 6–10.) Google acknowledges that this Court previously found venue under identical facts in *SEVEN Networks, LLC v. Google LLC*, 315 F. Supp. 3d 933 (E.D. Tex. 2018). (*Id.* at 1.) Google does not dispute any of these underlying facts, but instead urges the same legal arguments that this Court denied in *SEVEN*. (*Id.* at 4 (noting that the facts before the Court in *SEVEN* have remained unchanged and are still undisputed).) The Court sees no reason to depart from its prior decision and finds that venue in this case is proper for the same reasons outlined in *SEVEN*. Accordingly, Google’s Motion to Dismiss for Improper Venue Under Rule 12(b)(3) and 28 U.S.C. § 1406 (Dkt. No. 13) is denied.²

In addressing Google’s Motion, the Court believes it appropriate to briefly discuss certain aspects of its holding in *SEVEN*, particularly its future implications, as raised in Judge Reyna’s dissent in *In re Google*, No. 2018-152, 2018 WL 5536478 (Oct. 29, 2018). His dissent opines that

² Google explains that in *Personal Audio, LLC v. Google, Inc.*, 280 F. Supp. 3d 922, 934 (E.D. Tex. 2017), Judge Clark held that Google’s GGC servers are not a “regular and established place of business” under § 1400(b). (Dkt. No. 13 at 1–2.) Google argues that “[a]fter this Court’s decision in *SEVEN* and the Federal Circuit’s subsequent mandamus decision, the Northern District of Texas noted the conflict in this District between *SEVEN* and *Personal Audio* and agreed with Judge Clark.” (*Id.* at 2 (citing *CUPP Cybersecurity, LLC, v. Symantec Corp.*, No. 3:18-cv-01554, Dkt. No. 53 at 6 (N.D. Tex. Dec. 21, 2018).) The Court disagrees with the legal analysis in *CUPP* for the same reasons it declined to follow *Personal Audio* in *SEVEN*. *See SEVEN*, 315 F. Supp.3d at 950–54, 956, 965–66.


the Court’s “current reading of § 1400(b) suggests that merely owning and controlling computer hardware (i.e., servers) that is involved in some company business is sufficient” to confer venue. *Google*, 2018 WL 5536478, at *5. He also read this Court’s decision as implying that “a company could potentially become subject to venue in any judicial district in which a physical object belonging to the company was located.” *Id.* at *6.

By its holding in *SEVEN*, the Court neither intends nor approves the view that venue is proper everywhere. As the Federal Circuit noted in *Cray* and as this Court reiterated in *SEVEN*, the venue analysis under § 1400(b) must hew closely to the language of the statute. *Cray*, 871 F.3d at 1362; *SEVEN*, 315 F. Supp. 3d at 939. The Federal Circuit also explained that whether venue is proper will depend on the unique facts of each case, in which “no precise rule has been laid down.” *Cray*, 871 F. 3d at 1362. In *SEVEN*, the Court’s venue analysis was grounded largely on the fact that (1) Google’s business is delivering online content to users, and (2) the GGC servers are a part of Google’s three-tiered network that conducts this very activity. *SEVEN*, 315 F. Supp. 3d at 947. (*See* Dkt. No. 13-6 (Declaration of Keith McCallion on behalf of Google).) That is, it is the *specific nature of Google’s business* and the *particular facts of this case* that lead the Court to conclude that the GGC servers are a “regular and established place of business” of Google. By holding such, the Court does not intend that venue is proper in any judicial district where a defendant owns, controls, or otherwise has a connection to a piece of property, real or personal, that is related to the defendant’s business. Rather, the specific and fact-based nature, extent, and type of business will inform whether a particular place in a district qualifies as a “regular and established place of business” of the defendant. *See Cray*, 871 F. 3d at 1364 (“A further consideration for this requirement might be the nature and activity of the alleged place of business of the defendant in the district in comparison with that of other places of business of the defendant

in other venues. Such a comparison might reveal that the alleged place of business is not really a place of business at all.”). It was with a careful view toward the discovery-based evidentiary facts in that particular situation, coupled with the specific parameters of *Cray* in mind, that the Court reached its conclusions in *SEVEN*. Given the present case, which is on all fours with the facts in *SEVEN*, the Court denies the Motion.

So Ordered this

Aug 7, 2019



RODNEY GILSTRAP
UNITED STATES DISTRICT JUDGE

EXHIBIT 4

**FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

SUPER INTERCONNECT
TECHNOLOGIES LLC,

Plaintiff,

V.

HUAWEI DEVICE CO. LTD., HUAWEI
DEVICE USA, INC., HUAWEI DEVICE
(SHENZHEN) CO., LTD., HUAWEI
DEVICE (DONGGUAN) CO., LTD.,

GOOGLE LLC,

Defendants.

[illegible]

CIVIL ACTION NO. 2:18-CV-00462-JRG
(LEAD CASE)

CIVIL ACTION NO. 2:18-CV-00462-JRG
(MEMBER CASE)

ORDER

Before the Court is Plaintiff Super Interconnect Technologies LLC (“SIT”) and Defendant Google LLC’s (“Google”) (collectively, the “Parties”) Joint (Agreed) Motion to Stay (the “Motion”). (Dkt. No. 101.) In the Motion, the Parties request a stay of all deadlines in the Third Amended Docket Control Order (Dkt. No. 95) pending an Order from this Court responsive to the Federal Circuit’s order directing this Court to dismiss or transfer this action. *See In re Google LLC*, No. 2019-126, 2020 WL 728165 (Fed. Cir. Feb. 13, 2020).

Having considered the Motion, its joint nature, and the possibility that further guidance from the Federal Circuit might be forthcoming via a motion for rehearing, the Court is of the opinion that the Motion should be and hereby is **GRANTED**. Accordingly, it is **ORDERED** that all deadlines in the above-captioned cases are **STAYED** for thirty (30) days from the issuance of this Order. It is further **ORDERED** that the Parties file a joint status report addressing the status

of this matter at least forty-eight (48) hours prior to the expiration of the stay, at which point the court may determine whether the stay should be continued or lifted in light of such status report.

So ORDERED and SIGNED this 18th day of February, 2020.



RODNEY GILSTRAP
UNITED STATES DISTRICT JUDGE

EXHIBIT 5

**THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

SUPER INTERCONNECT
TECHNOLOGIES LLC,

Plaintiff,

V.

HUAWEI DEVICE CO. LTD., et al.

Defendants.

SUPER INTERCONNECT
TECHNOLOGIES LLC,

Plaintiff,

V.

GOOGLE LLC,

Defendants.

Case No. 2:18-CV-462-JRG
LEAD CASE

Case No. 2:18-CV-463-JRG
CONSOLIDATED CASE

CLAIM CONSTRUCTION MEMORANDUM AND ORDER

Before the Court is the Opening *Markman* Brief (Dkt. No. 59) filed by Plaintiff Super Interconnect Technologies LLC (“Plaintiff” or “SIT”). Also before the Court is the response filed by Defendants Huawei Device Co. Ltd., Huawei Device (Hong Kong) Co., Ltd., Huawei Device USA, Inc. (collectively, “Huawei”), and Google LLC (“Google”) (all, collectively, “Defendants”)¹ (Dkt. No. 64), as well as Plaintiff’s reply (Dkt. No. 67) and Plaintiff’s supplemental reply (Dkt. No. 79).²

¹ Prior to the December 18, 2019 claim construction hearing, the Court granted a joint motion to dismiss the Huawei Defendants pursuant to a settlement. (See Dkt. No. 88, Dec. 6, 2019 Order.) Although Defendant Google is the only remaining Defendant, for simplicity the Court continues to refer to “Defendants,” plural, in the present Claim Construction Memorandum and Order.

² The Court granted Plaintiff's motion to file a supplemental reply brief and a supplemental declaration of Plaintiff's expert. (*See* Dkt. No. 71; *see also* Dkt. No. 72, Nov. 4, 2019 Order.)

The Court held a claim construction hearing on December 18, 2019.

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I. BACKGROUND

Plaintiff alleges infringement of United States Patents No. 6,463,092 (“the ’092 Patent”), 7,158,593 (“the ’593 Patent”), and 7,627,044 (“the ’044 Patent”). (Dkt. No. 59, Exs. A–C).

The ’092 Patent, titled “System and Method for Sending and Receiving Data Signals over a Clock Signal Line,” issued on October 8, 2002, and bears an earliest priority date of September 10, 1998. Plaintiff submits that the ’092 Patent “relates generally to the field of data communications and involves the transmission of clock and data signals, including the transmission of clock signals and data signals on the same transmission line.” (Dkt. No. 59, at 3.)

The Abstract of the ’092 Patent states:

The system preferably includes a unique transmitter that sends both clock and data signals over the same transmission line. The receiver uses the same transmission line to send data signals back to the transmitter. The transmitter comprises a clock generator, a decoder and a line interface. The clock generator produces a clock signal that includes a variable position falling edge. The falling edge position is decoded by the receiver to extract data from the clock signal. The receiver comprises a clock re-generator, a data decoder and a return channel encoder. The clock re-generator monitors the transmission line, receives signals, filters them and generates a clock signal at the receiver from the signal on the transmission line. The return channel encoder generates signals and asserts them on the transmission line. The signal is asserted or superimposed over the clock & data signal provided by the transmitter.

The ’593 Patent, titled “Combining a Clock Signal and a Data Signal,” issued on January 2, 2007, and bears an earliest priority date of March 16, 2001. Plaintiff submits that the ’593 Patent “relates generally to transmitting clock and data signals.” (Dkt. No. 59, at 5.) The Abstract of the ’593 Patent states:

A method of transmitting data in a system including at least one data channel and a separate clock channel is disclosed. The method involves combining a clock signal to be transmitted on the clock channel with a data signal to generate a combined clock and data signal. In one embodiment, the data signal has been generated from data words using an encoding scheme that shifts an energy spectrum of the data signal away from an energy spectrum of the clock signal. In another embodiment, the clock signal has a plurality of pulses each having a front edge and a back edge,

and the data signal is modulated onto the clock signal by moving at least one edge (i.e. front or back or both) of the plurality of pulses, thereby to create a combined clock and data signal.

The '044 Patent, titled "Clock-Edge Modulated Serial Link with DC-Balance Control," issued on December 1, 2009, and bears a filing date of October 31, 2005. Plaintiff submits that the '044 Patent "relates generally to the transmission of serial signals, such as in a transition minimized differential signaling system." (Dkt. No. 59, at 6.) The Abstract of the '044 Patent states:

A battery powered computing device has a channel configured as a single direct current balanced differential channel. A signal transmitter is connected to the channel. The signal transmitter is configured to apply clock edge modulated signals to the channel, where the clock edge modulated signals include direct current balancing control signals. A signal receiver is connected to the channel. The signal receiver is configured to recover the direct current balancing control signals.

The '044 Patent incorporates-by-reference the '092 Patent. '044 Patent at 3:15–18.

Shortly before the start of the December 18, 2019 hearing, the Court provided the parties with preliminary constructions with the aim of focusing the parties' arguments and facilitating discussion. Those preliminary constructions are noted below within the discussion for each term.

II. LEGAL PRINCIPLES

It is understood that "[a] claim in a patent provides the metes and bounds of the right which the patent confers on the patentee to exclude others from making, using or selling the protected invention." *Burke, Inc. v. Bruno Indep. Living Aids, Inc.*, 183 F.3d 1334, 1340 (Fed. Cir. 1999). Claim construction is clearly an issue of law for the court to decide. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970–71 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996).

"In some cases, however, the district court will need to look beyond the patent's intrinsic evidence and to consult extrinsic evidence in order to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period." *Teva Pharms.*

USA, Inc. v. Sandoz, Inc., 135 S. Ct. 831, 841 (2015) (citation omitted). “In cases where those subsidiary facts are in dispute, courts will need to make subsidiary factual findings about that extrinsic evidence. These are the ‘evidentiary underpinnings’ of claim construction that we discussed in *Markman*, and this subsidiary factfinding must be reviewed for clear error on appeal.” *Id.* (citing 517 U.S. 370).

To ascertain the meaning of claims, courts look to three primary sources: the claims, the specification, and the prosecution history. *Markman*, 52 F.3d at 979. The specification must contain a written description of the invention that enables one of ordinary skill in the art to make and use the invention. *Id.* A patent’s claims must be read in view of the specification, of which they are a part. *Id.* For claim construction purposes, the description may act as a sort of dictionary, which explains the invention and may define terms used in the claims. *Id.* “One purpose for examining the specification is to determine if the patentee has limited the scope of the claims.” *Watts v. XL Sys., Inc.*, 232 F.3d 877, 882 (Fed. Cir. 2000).

Nonetheless, it is the function of the claims, not the specification, to set forth the limits of the patentee’s invention. Otherwise, there would be no need for claims. *SRI Int’l v. Matsushita Elec. Corp.*, 775 F.2d 1107, 1121 (Fed. Cir. 1985) (en banc). The patentee is free to be his own lexicographer, but any special definition given to a word must be clearly set forth in the specification. *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1388 (Fed. Cir. 1992). Although the specification may indicate that certain embodiments are preferred, particular embodiments appearing in the specification will not be read into the claims when the claim language is broader than the embodiments. *Electro Med. Sys., S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 1054 (Fed. Cir. 1994).

This Court's claim construction analysis is substantially guided by the Federal Circuit's decision in *Phillips v. AWH Corporation*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). In *Phillips*, the court set forth several guideposts that courts should follow when construing claims. In particular, the court reiterated that "the claims of a patent define the invention to which the patentee is entitled the right to exclude." *Id.* at 1312 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). To that end, the words used in a claim are generally given their ordinary and customary meaning. *Id.* The ordinary and customary meaning of a claim term "is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Id.* at 1313. This principle of patent law flows naturally from the recognition that inventors are usually persons who are skilled in the field of the invention and that patents are addressed to, and intended to be read by, others skilled in the particular art. *Id.*

Despite the importance of claim terms, *Phillips* made clear that "the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.* Although the claims themselves may provide guidance as to the meaning of particular terms, those terms are part of "a fully integrated written instrument." *Id.* at 1315 (quoting *Markman*, 52 F.3d at 978). Thus, the *Phillips* court emphasized the specification as being the primary basis for construing the claims. *Id.* at 1314–17. As the Supreme Court stated long ago, "in case of doubt or ambiguity it is proper in all cases to refer back to the descriptive portions of the specification to aid in solving the doubt or in ascertaining the true intent and meaning of the language employed in the claims." *Bates v. Coe*, 98 U.S. 31, 38 (1878). In addressing the role of

the specification, the *Phillips* court quoted with approval its earlier observations from *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998):

Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim. The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction.

Phillips, 415 F.3d at 1316. Consequently, *Phillips* emphasized the important role the specification plays in the claim construction process.

The prosecution history also continues to play an important role in claim interpretation. Like the specification, the prosecution history helps to demonstrate how the inventor and the United States Patent and Trademark Office (“PTO”) understood the patent. *Id.* at 1317. Because the file history, however, “represents an ongoing negotiation between the PTO and the applicant,” it may lack the clarity of the specification and thus be less useful in claim construction proceedings. *Id.* Nevertheless, the prosecution history is intrinsic evidence that is relevant to the determination of how the inventor understood the invention and whether the inventor limited the invention during prosecution by narrowing the scope of the claims. *Id.*; see *Microsoft Corp. v. Multi-Tech Sys., Inc.*, 357 F.3d 1340, 1350 (Fed. Cir. 2004) (noting that “a patentee’s statements during prosecution, whether relied on by the examiner or not, are relevant to claim interpretation”).

Phillips rejected any claim construction approach that sacrificed the intrinsic record in favor of extrinsic evidence, such as dictionary definitions or expert testimony. The *en banc* court condemned the suggestion made by *Texas Digital Systems, Inc. v. Telegenix, Inc.*, 308 F.3d 1193 (Fed. Cir. 2002), that a court should discern the ordinary meaning of the claim terms (through dictionaries or otherwise) before resorting to the specification for certain limited purposes. *Phillips*, 415 F.3d at 1319–24. According to *Phillips*, reliance on dictionary definitions at the

expense of the specification had the effect of “focus[ing] the inquiry on the abstract meaning of words rather than on the meaning of claim terms within the context of the patent.” *Id.* at 1321. *Phillips* emphasized that the patent system is based on the proposition that the claims cover only the invented subject matter. *Id.*

Phillips does not preclude all uses of dictionaries in claim construction proceedings. Instead, the court assigned dictionaries a role subordinate to the intrinsic record. In doing so, the court emphasized that claim construction issues are not resolved by any magic formula. The court did not impose any particular sequence of steps for a court to follow when it considers disputed claim language. *Id.* at 1323–25. Rather, *Phillips* held that a court must attach the appropriate weight to the intrinsic sources offered in support of a proposed claim construction, bearing in mind the general rule that the claims measure the scope of the patent grant.

The Supreme Court of the United States has “read [35 U.S.C.] § 112, ¶ 2 to require that a patent’s claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910, 134 S. Ct. 2120, 2129 (2014). “A determination of claim indefiniteness is a legal conclusion that is drawn from the court’s performance of its duty as the construer of patent claims.” *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1347 (Fed. Cir. 2005) (citations and internal quotation marks omitted), *abrogated on other grounds by Nautilus*, 134 S. Ct. 2120. “Indefiniteness must be proven by clear and convincing evidence.” *Sonix Tech. Co. v. Publ’ns Int’l, Ltd.*, 844 F.3d 1370, 1377 (Fed. Cir. 2017).

III. AGREED TERMS

The parties submitted the following agreements in their August 14, 2019 P.R. 4-3 Joint Claim Construction and Prehearing Statement (Dkt. No. 47) and in their October 30, 2019 P.R. 4-5(d) Joint Claim Construction Chart (Dkt. No. 69, at 2):

<u>Term</u>	<u>Agreed Construction</u>
“clock signal” <ul style="list-style-type: none"> • ’092 Patent, Claim 1; • ’593 Patent, Claims 34, 35; • ’044 Patent, Claims 1, 8, 13 	“signal with uses that include timing or synchronization”
“the clock signal is pulse width modulated” <ul style="list-style-type: none"> • ’044 Patent, Claims 1, 13 	plain and ordinary meaning
“pulse width modulated clock signal” <ul style="list-style-type: none"> • ’044 Patent, Claims 8, 13 	plain and ordinary meaning
“data words” <ul style="list-style-type: none"> • ’593 Patent, Claim 34 	plain and ordinary meaning
“effective loop bandwidth of a clock recovery block” <ul style="list-style-type: none"> • ’593 Patent, Claim 34 	“frequency pass range of a clock recovery block”
“duty cycle” <ul style="list-style-type: none"> • ’044 Patent, Claims 2, 3 	“the ratio of a pulse width to a period”
“duty cycle position” <ul style="list-style-type: none"> • ’044 Patent, Claims 2, 3 	“specified ratio of a pulse width to a period”

IV. DISPUTED TERMS IN MULTIPLE PATENTS

A. “control signal”

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
Plain and ordinary meaning Alternatively: “a signal that controls”	“a signal that controls processing of data” ³

(Dkt. No. 47, Ex. A, at 1; Dkt. No. 59, at 8; Dkt. No. 64, at 15; Dkt. No. 69, at 4.) The parties submit that this term appears in Claim 1 of the ’092 Patent and Claims 1, 8, and 13 of the ’044 Patent. (Dkt. No. 47, Ex. A, at 1; Dkt. No. 69, at 4.)

Shortly before the start of the December 18, 2019 hearing, the Court provided the parties with the following preliminary construction: “a signal, distinct from the data signal, that controls some aspect of transmission.”

(1) The Parties’ Positions

Plaintiff argues that “[i]nstead of tracking the plain and ordinary meaning, Defendants’ construction attempts to import many limitations into the term ‘control signal.’” (Dkt. No. 59, at 9.) Plaintiff also submits that “when the inventors intended to include a transmitter and receiver in their claims, they explicitly recited both a transmitter and receiver in the claims,” and Plaintiff urges that Defendants’ proposal would improperly “constru[e] a non-functional term in an apparatus claim as requiring a particular later use.” (*Id.*, at 9 & 10.)

Defendants respond that “Defendants’ construction clearly distinguishes a ‘control signal’ from other types of signals in the claims, such as a ‘data signal,’ which does not control how data is processed but instead transmits data.” (Dkt. No. 64, at 16.) Defendants point to the phrase

³ Defendants previously proposed: “signal sent between a transmitter and a receiver to control processing of data.” (Dkt. No. 47, Ex. A, at 1.)

“clock, data and control signals” in the claims, as well as in the specification, as evidence that these are three different types of signals. (*Id.*) Further, Defendants argue that “[a] ‘control signal’ is also sent separately from data signals, either at separate time blocks or on separate signal lines.” (*Id.*, at 17.) Finally, Defendants argue that Plaintiff’s proposal “is broad enough to encompass a ‘data signal’” and “is incomplete for failing to specify what the ‘control signal’ is actually controlling.” (*Id.*, at 18.)

Plaintiff replies that “the term ‘control signal’ is a broad term, and reading-in a limitation that the signal must control ‘processing of data’ excludes its full scope.” (Dkt. No. 67, at 2.) Plaintiff submits that “Defendants do not cite to any statement of lexicography or disavowal to support that added limitation.” (*Id.*, at 1.)

At the December 18, 2019 hearing, Defendants were amenable to the Court’s preliminary construction. Plaintiff disagreed with “controls some aspect of transmission,” arguing that a control signal could be any signal, modulated onto a carrier, that is not a data signal. Plaintiff cited various disclosures in the specification, arguing that a control signal can be used for various purposes. *See* ’044 Patent at 1:25–36; *see also* ’092 Patent at 6:28–30. Plaintiff also suggested replacing “controls” (in the Court’s preliminary construction) with “can control” or “configured to control.” Defendants responded that other claim language already recites “configured to.”

(2) Analysis

As a threshold matter, Plaintiff cites the claim construction analysis of various courts regarding “control signal” in other patents,⁴ but such citations are of minimal persuasive weight,

⁴ (Dkt. No. 69, at 8–9):

Many Courts have already construed the term “control signal” as plain and ordinary meaning or with a construction such as “a signal that controls.” *See, e.g., Personalized Media Commc’ns, LLC v. Apple, Inc.*, C.A. No. 2:15-cv-01206, 2016 WL 6299860, at *46 (E.D. Tex. Oct. 26, 2016) (“The Court construes ‘control

if any, because “claims of unrelated patents must be construed separately.” *e.Digital Corp. v. Futurewei Techs., Inc.*, 772 F.3d 723, 727 (Fed. Cir. 2014).

Plaintiff also cites an extrinsic telecommunications dictionary that defines “control signal” as follows:

1. In the public network, control signals are used for auxiliary functions in both customer loop signaling and interoffice trunk signaling. Control signals are used in the customer loop for Coin Collect and Coin Return and Party Identification. Control signals used in interoffice trunk signaling include Start Dial (Wink or Delay Dial) signals, Keypulse (KP) signals or Start Pulse (ST) signals.
2. In modem communications, control signals are modem interface signals used to announce, start, stop or modify a function. Here’s a table showing common RS-232-C and ITU-T V.24 control signals

(Dkt. No. 59, Ex. E, *Newton’s Telecom Dictionary* 151–52 (11th ed. 1996).)

Plaintiff fails to demonstrate that this extrinsic telecommunications definition of “control signal” is applicable in the context of the patents-in-suit. Further, even assuming that this definition is applicable, this definition at least arguably supports Defendants’ proposal that control signals relate to processing data, especially as discussed in the definition regarding “modem communications.” *Id.*

signal’ to mean ‘a signal that controls.’”); *Personalized Media Comm’n, LLC v. Motorola, Inc.*, No. 2:08-CV-70, 2011 WL 4591898, at *26 (E.D. Tex. Sept. 30, 2011) (“The court agrees with PMC that attempting to construe this simple and straightforward phrase is more likely to confuse, not assist, the jury. As such, the court construes the term ‘control signal’ and the associated term ‘signal which controls said receiver’ to have their plain and ordinary meaning.”); *Digi Int’l, Inc. v. Lantronix, Inc.*, 402 F. Supp. 2d 1041, 1052 (D. Minn. 2005) (“The Court agrees that the phrase ‘generate device control signals’ needs very little construction. The Court finds that the plain meaning of the term to a person of ordinary skill in the art would be that the software enables the client machine ‘to generate signals that control the device.’”); *see also Nordyne Inc. v. RBC Mfg. Corp.*, C.A. No. 4:09-cv-00203, 2011 WL 403213, at *7 (E.D. Mo. Feb. 2, 2011); *Power Integrations, Inc. v. ON Semiconductor Corp.*, C.A. No. 16-cv-06371, 2018 WL 5603631, at *15 (N.D. Cal. Oct. 26, 2018).

Turning to the patents-in-suit, Claim 1 of the '092 Patent, for example, recites (emphasis added):

1. An apparatus for transmitting a clock signal and data signals over a signal line, the apparatus comprising a clock generator having a first input, a second input and an output, the clock generator modulating a falling edge of an output signal to indicate different data values, the first input of the clock generator coupled to receive a clock signal, and the second input of the clock generator coupled to receive *a control signal indicating a data value to be transmitted*.

The surrounding language in this claim, which refers to “indicating a data value to be transmitted,” is consistent with Defendants’ proposal that a “control signal” relates to processing data. Yet, to whatever extent this could be interpreted as meaning that the term “control signal” is limited to signals that control processing of data, the express recital of “indicating a data value to be transmitted” weighs at least somewhat against such a narrow interpretation of “control signal.” In other words, that a particular “control signal” is related to processing data does not mean that *all* “control signals” are necessarily so limited.

Defendants urge that the recital of “clock, data and control signals” in claims of the '044 Patent evinces that there are three different types of signals, namely clock signals, data signals, and control signals. Indeed, as Defendants properly submit, “different claim terms are presumed to have different meanings.” *Helmsderfer v. Bobrick Washroom Equip., Inc.*, 527 F.3d 1379, 1382 (Fed. Cir. 2000).

But even accepting that “control signals” are distinct from clock signals and data signals, it does not necessarily follow that “control signals” must control processing of data. Defendants fail to show otherwise, although Defendants cite various disclosures in the specification. (*See* Dkt. No. 64, at 16–17 (citing '044 Patent at 1:25–31 (discussing mobile device interface including “22 lines with 18-bit video pixel data lines and *control signal* lines, such as dot-clock, data enable (DE), horizontal sync (HSYNC), vertical sync (VSYNC), and other display-specific configuration

settings”) (emphasis added), 1:48–49 (“it would be desirable to remove the dedicated clock channel and use only a single channel for transmitting the clock, data and control signals”), 1:56–59 (“it would be desirable to provide a low-power mobile device with a serial channel that supports clock, data and control signals, such as DC balancing control signals”), 3:1–3 (“The invention provides techniques to transfer a clock signal, data and control signals over a single channel.”), 3:56–59 (“For example, the *data* may be 6 bits of red pixel data, 6 bits of green pixel data, and 6 bits of blue pixel data. The *control signals* may include HSYNC, VSYNC, and DE signals.”) (emphasis added) & Fig. 3; ’092 Patent at 1:47–50 (“most systems include a variety of control signals that must be sent between the transmitter and the receiver to ensure proper operation, and maintain synchronization between the transmitter and the receiver”) & 1:58–60 (“in video data communication, much of the *data* must be transmitted in blocks during which *control signals* cannot be sent”) (emphasis added)).)

The specification disclosures cited by Defendants are simply consistent with what is already apparent in the claim language set forth above, namely that clock, data, and control signals are distinct from one another. *See Helmsderfer*, 527 F.3d at 1382 (quoted above); *see also Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) (“Where a claim lists elements separately, the clear implication of the claim language is that those elements are distinct component[s] of the patented invention.”) (citations and internal quotation marks omitted). Of note, however, this does not necessarily prohibit a “control signal” from overlapping with another signal. *Cf. Linear Tech. Corp. v. Int’l Trade Comm’n*, 566 F.3d 1049, 1055 (Fed. Cir. 2009) (“there is nothing in the claim language or specification that supports narrowly construing the terms to require a specific structural requirement or entirely distinct ‘second’ and ‘third’ circuits”).

The Court therefore rejects Defendants’ proposal of “a signal that controls processing of data.” At the December 18, 2019 hearing, both sides discussed an extrinsic technical dictionary, cited by Defendants, that includes a definition of “control signal” as: “Any signal that purposely affects the recording, processing, transmission or interpretation of data by a system element.” (Dkt. No. 64, Ex. 4, *The IEEE Standard Dictionary of Electrical and Electronics Terms* 218 (6th ed. 1996).) At the hearing, both sides discussed broadening the Court’s preliminary construction to encompass recording, processing, and interpretation as well as transmission.

The Court accordingly hereby construes **“control signal”** to mean **“a signal, distinct from the data signal, that controls some aspect of recording, processing, transmission, or interpretation.”**

B. “channel”

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
Plain and ordinary meaning Alternatively, should the Court determine that this term requires construction: “a path along which a signal can be sent”	“a path between a transmitter and a receiver along which a signal can be sent”

(Dkt. No. 47, Ex. A, at 5; Dkt. No. 59, at 10; Dkt. No. 64, at 21; Dkt. No. 69, at 7.) The parties submit that this term appears in Claim 34 of the ’593 Patent and Claims 1, 8, 9, 13, and 19 of the ’044 Patent. (Dkt. No. 47, Ex. A, at 5; Dkt. No. 69, at 7.)

Shortly before the start of the December 18, 2019 hearing, the Court provided the parties with the following preliminary construction: “a path along which a signal can be sent.”

(1) The Parties' Positions

Plaintiff submits a technical dictionary definition and also argues that “Defendants have unjustifiably added the limitations of both a transmitter and receiver into claims that do not require them.” (Dkt. No. 59, at 11.)

Defendants respond that Plaintiff’s proposed interpretation is overbroad because it “would allow a ‘channel’ to encompass a path internal to a transmitter or a receiver.” (Dkt. No. 64, at 22.) Defendants argue that “[i]n view of the claim language, the specifications’ characterization of the claimed ‘invention’ as a whole, the specifications’ repeated consistent usage of the term, and inventor testimony, ‘channel’ must refer to a path ‘between a transmitter and a receiver.’” (*Id.*, at 25.)⁵

Plaintiff replies that “[w]hen the inventors intended to include the requirement of both a transmitter and a receiver, they explicitly recited both a transmitter and a receiver *in the claims*.” (Dkt. No. 67, at 2.) Plaintiff also argues that “the Summary of the Invention section does not include any specific language that requires that any time the term ‘channel’ appears in a claim, so must the limitations of a transmitter and a receiver.” (*Id.*, at 3.)

At the December 18, 2019 hearing, Plaintiff agreed with the Court’s preliminary construction. Defendants responded by proposing that the term “channel” makes sense only in the context of an output of a transmitter or an input of a receiver. Defendants reiterated that a “channel” cannot be entirely within a transmitter or entirely within a receiver.

⁵ Defendants also submit deposition testimony of one of the named inventors, Gyudong Kim, that a “channel” is an electrical signal path between a transmitter and a receiver. (*See* Dkt. No. 64, Ex. 1, Aug. 21, 2019 G. Kim dep. at 92:5–9 & 222:9–223:1.) Such testimony is of little, if any, relevance in these claim construction proceedings. *See Howmedica Osteonics Corp. v. Wright Med. Tech., Inc.*, 540 F.3d 1337, 1346–47 (Fed. Cir. 2008) (noting that inventor testimony is “limited by the fact that an inventor understands the invention but may not understand the claims, which are typically drafted by the attorney prosecuting the patent application”).

(2) Analysis

Plaintiff submits a technical dictionary that sets forth various definitions of “channel” in various contexts, including a definition of “channel” as meaning “a path along which signals can be sent.” (Dkt. No. 59, Ex. F, *The IEEE Standard Dictionary of Electrical and Electronics Terms* 323 (6th ed. 1996).) Defendants do not appear to challenge this interpretation of “channel” as a general matter, as demonstrated by the similarities in the parties’ proposed constructions.

Instead, the parties dispute whether a “channel” in the patents-in-suit must be “between a transmitter and a receiver.” Such a requirement is evident in Claim 13 of the ’044 Patent, which expressly recites a “signal transmitter configured to apply the multiplexed signals to the channel” and a “signal receiver configured to de-multiplex the clock, data and control signals from the channel node.” Claim 34 of the ’593 Patent and Claims 1, 8, 9, and 19 of the ’044 Patent, by contrast, are different in this regard. Claim 34 of the ’593 Patent, for example, recites (emphasis added):

34. A method of transmitting data in a system including at least one data *channel* and a separate clock *channel*, the method comprising:

combining a clock signal to be transmitted on the clock *channel* with an encoded data signal having a plurality of encoded data words to generate a combined clock and encoded data signal;

the clock signal having a plurality of pulses and each pulse having a front edge and a back edge and a pulse width defined by the time difference of the front edge and back edge;

the combining further including encoding an unencoded data to generate an encoded data and modulating the encoded data onto the clock signal based on the encoded data by: (i) moving the front edge only of a particular pulse, (ii) moving the back edge only of a particular pulse, or (iii) moving both the front edge and the back edge of a particular pulse by different amounts or in different directions, wherein the movement in any of the cases causing a change in a change in the width of the particular pulse and the moving of at least one edge is effective to combine the encoded data signal onto the clock signal; and

transmitting the combined clock and encoded data signal on the clock *channel*;

wherein the encoded data signal is generated from the unencoded data words using an encoding scheme that shifts an energy spectrum of the combined

clock and encoded data signal away from an effective loop band width of a clock recovery block.

Claim 1 of the '044 Patent likewise recites only a transmitter. Claim 8 of the '044 Patent recites only a receiver. Claims 9 and 19 of the '044 Patent depend from Claims 8 and 13, respectively.

Defendants point to the Summary of the Invention of the '044 Patent, which refers to “[t]he invention” as including a transmitter and a receiver connected to a channel (*see* '044 Patent at 1:63–2:18), but this disclosure reflects no clear intent to define the claimed invention as a whole or to narrowly define the term “channel.” *See, e.g., Honeywell Int’l, Inc. v. ITT Indus., Inc.*, 452 F.3d 1312, 1318 (Fed. Cir. 2006) (“the written description refers to the fuel filter as ‘this invention’ or ‘the present invention’”); *Blackbird Tech LLC v. ELB Elecs., Inc.*, 895 F.3d 1374, 1378 n.2 (Fed. Cir. 2018) (“The Summary of the Invention often spans many paragraphs, columns, or even pages. In cases where we have held limitations ought to be read in, it was not simply because those limitations appeared in the Summary of the Invention. There was specific language that made clear those limitations were important to the claimed invention.”) (citation omitted).

Defendants also fail to demonstrate that the specifications define the term “by implication.” *Bell Atl. Network Servs., Inc. v. Covad Commc’ns Grp, Inc.*, 262 F.3d 1258, 1271 (Fed. Cir. 2001) (“when a patentee uses a claim term throughout the entire patent specification, in a manner consistent with only a single meaning, he has defined that term by implication”). Defendants point to disclosures in which a “channel” is a path through which a transmitter sends signals to a receiver. *See, e.g.,* '044 Patent at Abstract (“[a] signal transmitter is connected to the channel” and “is configured to apply . . . signals to the channel” and “[a] signal receiver is connected to the channel” and “is configured to recover the . . . signals”), 3:53–4:11 & 4:36–51; '593 Patent at 5:26–36, 7:4–10, 6:21–7:30, 10:53–11:18 & Fig. 1.

Defendants’ proposed construction, however, would appear to require not only the presence of the path but also the presence of a transmitter and the presence of a receiver. Such an interpretation is disfavored by the above-cited claims, some of which refer to only a transmitter or only a receiver. The *Ruckus Wireless* case cited by Defendants is therefore unpersuasive. *See Ruckus Wireless, Inc. v. Innovative Wireless Solutions, LLC*, 824 F.3d 999, 1003–04 (Fed. Cir. 2016) (“every embodiment described in the specification utilizes a telephone wire, and . . . [t]hough these statements do not expressly exclude wireless communications from the meaning of ‘communications path,’ they do not include it, and they discourage that understanding”).

Nonetheless, the parties essentially agree that a “channel” exists in the context of a transmitter or a receiver. This understanding is consistent with disclosures in the specification. *See, e.g.*, ’044 Patent at 1:63–2:4. The Court rejects Defendants’ proposal of “between a transmitter and a receiver” and instead refers to a channel being a path for sending toward a receiver or receiving from a transmitter. This interpretation also reflects the substantial agreement apparent among the parties at the December 18, 2019 hearing that a “channel” is a path and does not itself include a transmitter or a receiver.

The Court accordingly hereby construes **“channel”** to mean **“a path along which a signal can be sent toward a receiver or can be received from a transmitter.”** In adopting this construction, the Court expressly relies upon the apparent understanding between the parties that a “channel” does not itself need to include a transmitter or a receiver.

V. DISPUTED TERMS IN THE ’092 PATENT

C. “An apparatus for transmitting a clock signal and data signals over a signal line”

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
Non-limiting preamble, no construction necessary	Preamble limiting.

(Dkt. No. 47, Ex. A, at 1; Dkt. No. 59, at 11; Dkt. No. 64, at 9; Dkt. No. 69, at 10.) The parties submit that this term appears in Claim 1 of the '092 Patent. (Dkt. No. 47, Ex. A, at 1; Dkt. No. 69, at 10.)

Shortly before the start of the December 18, 2019 hearing, the Court provided the parties with the following preliminary construction: “Preamble limiting.”

(1) The Parties’ Positions

Plaintiff argues that “the preamble states merely a purpose or intended use of the invention, *i.e.*, ‘for transmitting a clock signal data signals over a signal line,’” and “the claim body defines a structurally complete invention.” (Dkt. No. 59, at 12.) Plaintiff also notes that “the preamble does not provide antecedent basis for any terms in the body of the claims” and that “the inventors did not rely on the preamble in the prosecution to distinguish over prior art.” (*Id.*)

Defendants respond that Plaintiff “fails to address asserted Claim 2, which recites ‘the signal line’ — an essential structural component that finds antecedent basis only in the preamble of Claim 1’s recitation of ‘a signal line.’” (Dkt. No. 64, at 9.) Defendants argue that the “signal line” is essential to the claims and is set forth in the specification as being essential to the claimed invention. (*Id.*, at 10.)

Plaintiff replies that “the caselaw does not suggest that simply because a preamble provides antecedent basis for a term in a *dependent* claim, that the preamble must also be limiting as to an independent claim *for which it does not provide any antecedent basis.*” (Dkt. No. 67, at 4.)

(2) Analysis

In general, a preamble limits the invention if it recites essential structure or steps, or if it is “necessary to give life, meaning, and vitality” to the claim. *Pitney Bowes Inc. v. Hewlett-Packard Co.*, 182 F.3d [1298,] 1305 [(Fed. Cir. 1999)]. Conversely, a preamble is not limiting “where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose

or intended use for the invention.” *Rowe v. Dror*, 112 F.3d 473, 478, 42 USPQ2d 1550, 1553 (Fed. Cir. 1997).

Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc., 289 F.3d 801, 808 (Fed. Cir. 2002); *see, e.g., Eaton Corp. v. Rockwell Int’l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003) (“When limitations in the body of the claim rely upon and derive antecedent basis from the preamble, then the preamble may act as a necessary component of the claimed invention.”); *C.W. Zumbiel Co. v. Kappos*, 702 F.3d 1371, 1385 (Fed. Cir. 2012) (finding preambles limiting because “‘containers’ as recited in the claim body depend on ‘a plurality of containers’ in the preamble as an antecedent basis”).

Also, “the purpose or intended use of the invention . . . is of no significance to claim construction” *See Pitney Bowes*, 182 F.3d at 1305. This principle has sometimes been characterized as “the presumption against reading a statement of purpose in the preamble as a claim limitation.” *Marrin v. Griffin*, 599 F.3d 1290, 1294–95 (Fed. Cir. 2010); *see Allen Eng’g Corp. v. Bartell Indus.*, 299 F.3d 1336, 1346 (Fed. Cir. 2002) (“Generally, the preamble does not limit the claims.”); *see also Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 769–71 (Fed. Cir. 2018) (in preamble reciting “[a] computer network for providing an information delivery service for a plurality of participants,” finding “information delivery service” to be non-limiting because it “merely describe[s] intended uses for what is otherwise a structurally complete invention”).

In some cases, language in the preamble may be merely “descriptive” of the limitations set forth in the body of the claim. *See IMS Tech., Inc. v. Haas Automation, Inc.*, 206 F.3d 1422, 1434 (Fed. Cir. 2000) (“The phrase ‘control apparatus’ in the preamble merely gives a descriptive name to the set of limitations in the body of the claim that completely set forth the invention.”); *see also Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1358 (Fed. Cir. 2012) (“if the body of the claim describes a structurally complete invention, a preamble is not limiting where it ‘merely gives a

name’ to the invention, extols its features or benefits, or describes a use for the invention”) (quoting *Catalina*, 289 F.3d at 809).

Claims 1 and 2 of the ’092 Patent recite (emphasis added):

1. *An apparatus for transmitting a clock signal and data signals over a signal line*, the apparatus comprising a clock generator having a first input, a second input and an output, the clock generator modulating a falling edge of an output signal to indicate different data values, the first input of the clock generator coupled to receive a clock signal, and the second input of the clock generator coupled to receive a control signal indicating a data value to be transmitted.
2. The apparatus of claim 1, further comprising a data decoder for extracting data signals, the data decoder having an input and an output, the data decoder for extracting data signals, the input of the data decoder coupled to *the signal line*, the output providing data from *the signal line*.

Thus, the recital of “a signal line” in the preamble of Claim 1 provides antecedent basis for the recital of “the signal line” in Claim 2. At the December 18, 2019 hearing, Plaintiff conceded that the preamble is limiting as to Claim 2.

As to Claim 1, Plaintiff cites authority for the proposition that a preamble of an independent claim need not be found limiting for the independent claim simply because the preamble provides antecedent basis for terms appearing in the body of a dependent claim. *See CreAgri, Inc. v. PinnacLife Inc.*, No. 11-CV-06635-LHK, 2013 WL 1663611, at *8 (N.D. Cal. Apr. 16, 2013) (Koh, J.). Defendants argue that “the ‘signal line’ is an essential structure of the claimed invention because it is through the ‘signal line’ that the ‘apparatus for transmitting’ in Claim 1 actually transmits its combined clock and data signal.” (Dkt. No. 64, at 11.)

On one hand, one of the authorities cited by Plaintiff concluded that the preamble of the independent claim was limiting as to the dependent claim but *not* as to the independent claim. *TQ Delta, LLC v. 2WIRE, Inc.*, No. 1:13-CV-01835-RGA, 2018 WL 4062617, at *5 (D. Del. Aug. 24, 2018) (Andrews, J.) (“neither party objected to the idea that a preamble could be construed as

limiting a dependent claim, but not limiting the independent claim in which it appears”). This approach appears to comport with the general principle, for example, that “[e]ach claim of a patent (whether in independent, dependent, or multiple dependent form) shall be presumed valid independently of the validity of other claims.” 35 U.S.C. § 282.

On the other hand, another one of the authorities cited by Plaintiff notes that even though there is no “bright-line rule,” a preamble term providing antecedent basis for a dependent claim “support[ed] the Court’s conclusion” that the preamble of the independent claim was limiting. *PersonalWeb Techs. LLC v. Int’l Bus. Machines Corp.*, No. 16-CV-01266-EJD, 2017 WL 2180980, at *13, n.15 (N.D. Cal. May 18, 2017) (Davila, J.).

Here, the recitals of “signal line” in above-reproduced Claims 1 and 2 do not merely provide “reference points . . . that aid in defining” the claimed invention. *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1350 (Fed. Cir. 1998). Instead, in order to give “life, meaning, and vitality” to the “output signal” recited in the body of Claim 1, the preamble of Claim 1 must be limiting. *Pitney Bowes*, 182 F.3d at 1305. This understanding is consistent with disclosures in the specification. *See, e.g.*, ’092 Patent at 3:55–62 (referring to Figure 1, “system 100 including the combined clock and data signal line of the present invention is shown”; “The transmitter 102 preferably provides a clock signal as well as data signals to the receiver 106 via the clock transmission line 104”); *Proveris Sci. Corp. v. Innovasys, Inc.*, 739 F.3d 1367, 1372 (Fed. Cir. 2014) (“A preamble is generally construed to be limiting if it ‘recites essential structure or steps’ . . . that are highlighted as important by the specification.”); *see id.* at 1373.

At the December 18, 2019 hearing, Plaintiff expressed concern that finding the preamble limiting would create confusion by potentially requiring three different types of signals on the signal line, namely a “clock signal,” “data signals,” and an “output signal.” In finding the preamble

limiting, the Court notes that the manner in which the “clock signal” and the “data signals” are transmitted over a “signal line” (as recited by the preamble) is by the clock generator modulating a falling edge of the clock signal to indicate different data values in an output signal. Thus, reading Claim 1 of the ’092 Patent as a whole, the only type of signal required to be transmitted on the signal line is an output signal.

The Court therefore hereby finds that **the preamble of Claim 1 of the ’092 Patent is limiting.**

D. “the clock generator modulating a falling edge of an output signal to indicate different data values”

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
Plain and ordinary meaning	Indefinite Alternatively: “the clock generator modulating a falling edge of the clock signal to indicate different data values in an output signal”

(Dkt. No. 47, Ex. A, at 3; Dkt. No. 59, at 13; Dkt. No. 64, at 11; Dkt. No. 69, at 11.) The parties submit that this term appears in Claim 1 of the ’092 Patent. (Dkt. No. 47, Ex. A, at 3; Dkt. No. 69, at 11.)

Shortly before the start of the December 18, 2019 hearing, the Court provided the parties with the following preliminary construction: “the clock generator modulating a falling edge of the clock signal to indicate different data values in an output signal.”

At the December 18, 2019 hearing, the parties reached agreement that this disputed term means: “the clock generator modulating a falling edge of the clock signal input to the clock generator to indicate different data values in an output signal.”

The Court accordingly hereby construes **“the clock generator modulating a falling edge of an output signal to indicate different data values”** to mean **“the clock generator modulating a falling edge of the clock signal input to the clock generator to indicate different data values in an output signal.”**

VI. DISPUTED TERMS IN THE '593 PATENT

E. “clock channel”

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
Plain and ordinary meaning Alternatively, should the Court determine that this term requires construction: “a path along which a signal carrying clock information can be sent”	“channel dedicated to transmitting a signal that is or includes a clock signal”

(Dkt. No. 47, Ex. A, at 7; Dkt. No. 59, at 15; Dkt. No. 64, at 25; Dkt. No. 69, at 12.) The parties submit that this term appears in Claim 34 of the '593 Patent. (Dkt. No. 47, Ex. A, at 7; Dkt. No. 69, at 12.)

Shortly before the start of the December 18, 2019 hearing, the Court provided the parties with the following preliminary construction: “a channel for carrying a clock signal or a signal that includes a clock signal (such as a combined clock and data signal).”

At the December 18, 2019 hearing, the parties agreed with the Court’s preliminary construction.

The Court therefore hereby construes **“clock channel”** to mean **“a channel for carrying a clock signal or a signal that includes a clock signal (such as a combined clock and data signal).”**

F. “shifts an energy spectrum of the combined clock and encoded data signal away from an effective loop bandwidth of a clock recovery block”

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
Plain and ordinary meaning Alternatively, should the Court determine that this term requires construction: “shifts an energy spectrum of the combined clock and encoded data signal away from the pass range of a clock recovery block”	Indefinite

(Dkt. No. 47, Ex. A, at 7; Dkt. No. 59, at 17; Dkt. No. 64, at 30.) The parties submit that this term appears in Claim 34 of the ’593 Patent. (Dkt. No. 47, Ex. A, at 7.)

“Since Plaintiff filed its opening brief, the parties have agreed to a construction for this term that reads: ‘shifts an energy spectrum of the combined clock and encoded data signal away from the pass range of a clock recovery block.’” (Dkt. No. 64, at 30.) At the December 18, 2019 hearing, the parties confirmed their agreement in this regard.

The Court therefore hereby construes **“shifts an energy spectrum of the combined clock and encoded data signal away from an effective loop bandwidth of a clock recovery block”** to mean **“shifts an energy spectrum of the combined clock and encoded data signal away from the pass range of a clock recovery block.”**

G. “A method of transmitting data in a system including at least one data channel and a separate clock channel”

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
Non-limiting preamble, no construction necessary	Preamble limiting

(Dkt. No. 47, Ex. A, at 4; Dkt. No. 59, at 22; Dkt. No. 64, at 19.) The parties submit that this term appears in Claim 34 of the ’593 Patent. (Dkt. No. 47, Ex. A, at 4.)

In its reply brief, Plaintiff submits: “For purposes of this case only, Plaintiff concedes that this preamble is limiting.” (Dkt. No. 67, at 7.) At the December 18, 2019 hearing, the parties confirmed their agreement in this regard.

Because Plaintiff thus no longer challenges Defendants’ proposal, the Court hereby finds that **the preamble of Claim 34 of the ’593 Patent is limiting.**

VII. DISPUTED TERMS IN THE ’044 PATENT

H. “direct current balancing control signals”

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
Plain and ordinary meaning Alternatively, should the Court determine that this term requires construction: “signals associated with direct current balancing”	Indefinite

(Dkt. No. 47, Ex. A, at 9; Dkt. No. 59, at 25; Dkt. No. 64, at 1; Dkt. No. 69, at 14.) The parties submit that this term appears in Claims 1, 8, and 13 of the ’044 Patent. (Dkt. No. 47, Ex. A, at 9; Dkt. No. 69, at 14.)

Shortly before the start of the December 18, 2019 hearing, the Court provided the parties with the following preliminary construction: “signals applied to affect the direct current balance of a signal.”

(1) The Parties’ Positions

Plaintiff argues that a person of ordinary skill in the art “would understand the scope of the term ‘direct current balancing control signals’ with reasonable certainty because the ’044 patent provides explicit examples of them” and because “the specification also discusses direct current balancing control signals in multiple areas of the ’044 patent.” (Dkt. No. 59, at 25 & 26.) Moreover, Plaintiff argues, “[e]ven without the explicit examples, a PHOSITA would have already

understood how those control signals can be incorporated into a pulse width modulated clock signal.” (*Id.*, at 26.)

Defendants respond that this term is indefinite because “it is not a term of art with any well-understood meaning while the specification not only fails to inform its scope, but is also irreconcilable with the claims.” (Dkt. No. 64, at 1.) Defendants argue that the specification disclosure relied upon by Plaintiff merely sets forth a statement of purpose rather than any explanation of what the disputed term means. (*See id.*, at 3–4.) In particular, Defendants argue that the disclosure that “[s]tandard techniques are used to generate and process the DC-balance control signals” is not helpful because “those signals were not a term of art and the specification fails to describe what those signals are, how they work, what information they transmit, or what they look like.” (*Id.*, at 4 (quoting ’044 Patent at 3:24–26).) Also, Defendants submit that “[t]here is no description in the ’044 Patent of how multiple ‘signals’ could be used together to control direct current balance.” (Dkt. No. 64, at 4.) Further, Defendants argue that the specification cannot be reconciled with the claim language because the specification “does not provide any disclosure of incorporating ‘direct current balancing control signal’ into a clock signal using pulse width modulation.” (*Id.*, at 5.) Finally, Defendants argue that “Plaintiff’s brief fails to support or even address its alternative proposal,” which Defendants urge “is so broad that it encompasses *any* digital signal” because “the property of ‘direct current balance’ is inherent to any digital signal.” (*Id.*, at 8.)

Plaintiff replies that the authorities cited by Defendants are distinguishable because “‘direct current balancing control signal’ is comprised of admittedly well-understood phrases and does not arbitrarily exclude signals that the term would otherwise cover” and because “the inventors provide examples of DC balancing control signals as signals that maintain DC-balance, increase DC-

balance, or decrease DC-balance, and describe that standard techniques are used to generate and process the DC-balance control signals.” (Dkt. No. 67, at 8 (citing ’044 Patent at 3:18–28).) Plaintiff submits that if the disputed term is not construed to have its plain meaning, then “the phrase ‘associated with’ best affords the term with an appropriately broad construction.” (*Id.*, at 10.)

In its supplemental reply, Plaintiff argues: “Defendants and Dr. Holberg [(Defendants’ expert)] incorrectly contend that this term is indefinite merely because it is ‘not a term of art’ and because (in their view) the specification does not provide sufficient detail on how the control signals are generated, how they purport to control or maintain DC balance, or how such signals are processed. Each of these arguments is flawed.” (Dkt. No. 79, at 5–6.) Plaintiff submits that “[i]mplementation details and design choices such as these are not required for a claim to survive an indefiniteness challenge.” (*Id.*, at 6 (citations omitted).)

At the December 18, 2019 hearing, Defendants reiterated their arguments that the disputed term is not a term of art with any commonly understood meaning, is not described in the specification in any meaningful way, and is not even understood by the named inventors.

(2) Analysis

“[T]he parties agree that the concept of ‘direct current balance’ (or ‘DC balance’) alone is well understood in the art and refers to having the same number of 0s and 1s in a signal.” (Dkt. No. 64, at 2.)

As a threshold matter, Defendants submit deposition testimony of two of the named inventors, Gyudong Kim and Min-Kyu Kim, in which the inventors were purportedly unable to articulate any specific meaning for this disputed term. (*See* Dkt. No. 64, Ex. 1, Aug. 21, 2019 G. Kim dep. at 163:21–164:17, 169:15–170:4, 177:21–178:4 & 180:7–181:16; *see also id.*, Ex. 2,

Sept. 10, 2019 M. Kim dep. at 24:10–25:22, 54:23–55:4 & 93:5–94:18.) Plaintiff counters by citing testimony that the disputed term purportedly has meaning. (*See* Dkt. No. 67, Ex. G, Sept. 10, 2019 M. Kim dep. at 24:10–29:21, 53:3–11 & 91:24–94:6; *see also id.*, Ex. H, Aug. 21, 2019 G. Kim dep. at 152:4–153:16, 161:10–171:5 & 176:7–182:16.)

This testimony of named inventors is of little, if any, relevance in these claim construction proceedings. *See Howmedica*, 540 F.3d at 1346–47 (noting that inventor testimony is “limited by the fact that an inventor understands the invention but may not understand the claims, which are typically drafted by the attorney prosecuting the patent application”).

Further, this testimony lacks clarity, revealing no clear persuasive value as to definiteness or indefiniteness. *See, e.g.*, Dkt. No. 67, Ex. H, Aug. 21, 2019 G. Kim dep. at 164:22–165:11 (“This DC balancing control signal is either we -- we achieve the DC balancing or intentionally break the DC balancing.”); *id.*, Ex. G, Sept. 10, 2019 M. Kim dep. at 26:12–15 & 28:22–25 (“the ‘DC balance control’ term can be those additional bits adding of the opposite polarity to compensate and make the DC balance close to the 0.5”).) To whatever extent this testimony is relevant, this testimony is not dispositive of whether the disputed term has a reasonably clear meaning in the relevant art. Even in the authority cited by Defendants, the challengers cited inventor testimony “[w]hile acknowledging that it is not dispositive on the issue of indefiniteness.” *Inguran, LLC v. ABS Global, Inc.*, No. 17-CV-446-WMC, 2019 WL 943515, at *6 (W.D. Wis. Feb. 26, 2019) (finding a term indefinite in part because the lead inventor testified he did not know what the term meant); *see id.* at *6–*8; *see also* Dkt. No. 64, at 7 (citing *Inguran*).

Further, Plaintiff notes that, in separate litigation regarding the patents-in-suit in the District of Delaware, the defendants have not asserted indefiniteness as to the term “direct current balancing control signals.” Instead, the defendants there propose that the term means “signals used

to select a pulse width to direct current balance.” *Super Interconnect Techs. LLC v. HP, Inc.*, No. 1:19-CV-169, Dkt. No. 43, at 7 (D. Del.). This position of the defendants in other litigation is of minimal, if any, probative weight as to the parties’ arguments in the present case.⁶

Turning to the present case and the patents-in-suit, the disputed term appears in all three of the independent claims of the ’044 Patent. Claim 1 of the ’044 Patent, for example, recites (emphasis added):

1. A signal transmitter, comprising:
 - a channel node to interface with a single direct current balanced differential channel; and
 - circuitry connected to the channel node, the circuitry being configured to multiplex clock, data and control signals and apply them to the channel node, wherein the clock signal is pulse width modulated to incorporate *direct current balancing control signals*.

The specification discloses that “DC-balancing control signals” can be incorporated into a signal so as to compensate for DC imbalances:

⁶ Defendants cite the indefiniteness analysis of courts regarding other terms in other patents, but these citations are not persuasive here (*see* Dkt. No. 64, at 1–2):

Courts have routinely found terms indefinite when they are not terms of art with well-understood meanings and the intrinsic record fails to clarify their meaning. For example, in *Capital Security Systems, Inc. v. NCR Corp.*, the Federal Circuit found the term “transactional operator” indefinite because it had “no commonly-accepted definition and its scope is unclear in view of the intrinsic evidence.” 725 F. App’x 952, 958–59 (Fed. Cir. 2018). The Federal Circuit reasoned that while it was at least clear that the “transactional operator” referred to a computer, beyond that, it was indeterminable which components described in the specification were part of the “transactional operator” computer. *Id.* As another example, a Delaware court found the term “needs analysis algorithm” indefinite because it “has no plain and ordinary meaning in the relevant art.” *Kaavo Inc. v. Amazon.com Inc.*, No. 14-353-LPS-CJB, 2018 WL 3025040, at *3 (D. Del. Jun. 18, 2018). The court reasoned that “[w]hile Plaintiff’s expert opines that a POSA would ‘be able to understand the scope of the invention with reasonable certainty’, she does not identify the purported ‘plain and ordinary meaning.’” *Id.* The court also found that the specification provided “insufficient guidance to allow a POSA to assess what ‘needs’ or ‘analysis’ is covered by the claimed ‘algorithm,’ or what specific algorithm could be used.” *Id.*

By way of example, the invention may be implemented by varying the falling edge of the clock signal. As shown in FIG. 2A, data are encoded as a variation of the clock falling edge position, while the position of the rising edge is fixed. The periodic occurrence of the rising edges enables easy extraction of the clock signal, from which the receiver can generate the “dot-clock” simply by dividing down the incoming signal (e.g., by 18) with no further clock recovery mechanism. The modulation of the falling edge position or the clock pulse width allows one to embed data and control signals in the clock, therefore reducing the pin count.

U.S. Pat. No. 6,463,092 (the ‘092 patent) utilizes a pulse width modulation technique of this type. The current invention builds upon the disclosed scheme of the ‘092 patent to achieve DC-balancing. In one embodiment, DC-balancing is achieved by inserting *DC-balancing control signals* into the serial link. The *DC-balancing control signals* may include signals to maintain DC-balance, increase DC-balance, and decrease DC-balance. Standard techniques are used to generate and process the *DC-balance control signals*. An aspect of the invention is directed toward incorporating the *DC-balance control signals* into a single serial link along with clock and data signals.

In one embodiment of the invention, the bit “0” is coded as a 50% duty cycle clock, indicating that no changes are necessary to keep balance. On the other hand, the bit “1” is coded as either a 25% or a 75% duty cycle clock, denoted as “1–” and “1+”, respectively, in FIG. 2(a). *Whether to use a 25% or a 75% duty cycle is determined by the DC value of the bits transmitted so far.* If the DC value is lower than nominal, the bit “1” is coded as 75%, and vice versa. With this encoding, the maximum disparity counted in unit pulse length (i.e., 25% pulse width) is only 2 and good DC-balance is achieved.

’044 Patent at 3:4–38 (emphasis added); *see id.* at 3:48–52 (“the control signals can be transmitted without requiring any additional channels”; “the invention leverages the DE 0 state (when data is not being sent) to send DC-balance and other control information on a single channel”).

The ’044 Patent also incorporates-by-reference the ’092 Patent (’044 Patent at 3:15–18), and the ’092 Patent discusses using pulse width modulation to incorporate signals. *See, e.g.,* ’092 Patent at 4:27–33. Based on the foregoing, the intrinsic evidence thus provides sufficient context for understanding incorporating “direct current balancing control signal” into a clock signal using pulse width modulation. At the December 18, 2019 hearing, Defendants argued that there is no linkage between the above-reproduced paragraph regarding duty cycles and the preceding

paragraph referring to “DC-balancing control signals.” At a minimum, however, the reference to “DC value” links the latter paragraph to the discussion of “DC-balancing control signals” in the preceding paragraph.

The specification thus describes how DC balance can be controlled, such as by inserting particular control signals that affect DC balance, and a person of ordinary skill in the art would understand the term “direct current balancing control signals” in this context. The opinions of Plaintiff’s expert are persuasive in this regard. (Dkt. No. 59, Ex. D, Aug. 14, 2019 Fayed Report, at 18–20.) The contrary opinions of Defendants’ expert are unpersuasive. (*See* Dkt. No. 64-1, Oct. 15, 2019 Holberg Decl., at ¶ 61 (“[A]lthough the paragraph at column 3, lines 15 to 29 [of the ’044 Patent] excerpted above incorporates the pulse width modulation technique of the ’092 Patent, the rest of the paragraph’s description of ‘DC-balancing control signals’ does not state that those signals are then used to modulate the ‘clock signal’ or any other signal.”); *see also id.* at ¶¶ 54–64 & 66.)

The Court therefore hereby expressly rejects Defendants’ indefiniteness argument. As to the proper construction, the parties’ arguments demonstrate that construction is appropriate to clarify the meaning of “control” in this context. Plaintiff’s alternative proposal replaces “control” with “associated with” but otherwise merely rearranges the words of the disputed term. The meaning of Plaintiff’s alternative proposal of “associated with” is not clear. Instead, the above-discussed intrinsic evidence demonstrates that direct current balancing control signals are signals applied to a signal to affect the direct current balance of that signal. Construing the disputed term in a manner consistent with the above-reproduced disclosures is particularly appropriate here because, as the parties agreed at the December 18, 2019 hearing, the disputed term as a whole has no well-established meaning in the relevant art. *See Intervet Inc. v. Merial Ltd.*, 617 F.3d 1282,

1287 (Fed. Cir. 2010) (citing *Phillips*, 415 F.3d at 1315) (“Idiosyncratic language, highly technical terms, or terms coined by the inventor are best understood by reference to the specification.”).

At the December 18, 2019 hearing, Plaintiff agreed with the Court’s preliminary construction but also suggested modifying it by replacing “applied to affect” with “designed to affect.” Defendants agreed that, if the Court rejects Defendants’ indefiniteness arguments, then replacing “applied to affect” with “designed to affect” would improve the Court’s construction.

The Court accordingly hereby construes “**direct current balancing control signals**” to mean “**signals designed to affect the direct current balance of a signal.**”

VIII. CONCLUSION

The Court adopts the constructions set forth in this opinion for the disputed terms of the patents-in-suit, and in reaching conclusions the Court has considered extrinsic evidence. The Court’s constructions thus include subsidiary findings of fact based upon the extrinsic evidence presented by the parties in these claim construction proceedings. *See Teva*, 135 S. Ct. at 841.

The parties are ordered that they may not refer, directly or indirectly, to each other’s claim construction positions in the presence of the jury. Likewise, the parties are ordered to refrain from mentioning any portion of this opinion, other than the actual definitions adopted by the Court, in the presence of the jury. Any reference to claim construction proceedings is limited to informing the jury of the definitions adopted by the Court.

SIGNED this 3rd day of January, 2012.

SIGNED this 5th day of January, 2020.


 ROY S. PAYNE
 UNITED STATES MAGISTRATE JUDGE

EXHIBIT 6

**FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

SUPER INTERCONNECT
TECHNOLOGIES LLC,

Plaintiff,

V.

HUAWEI DEVICE CO. LTD., HUAWEI
DEVICE USA, INC., HUAWEI DEVICE
(SHENZHEN) CO., LTD., HUAWEI
DEVICE (DONGGUAN) CO., LTD.,

GOOGLE LLC,

Defendants.

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**CIVIL ACTION NO. 2:18-CV-00462-JRG
(LEAD CASE)**

**CIVIL ACTION NO. 2:18-CV-00463-JRG
(MEMBER CASE)**

MEMORANDUM OPINION AND ORDER

Before the Court is Plaintiff Super Interconnect Technologies, LLC's ("SIT") Motion for Leave to Amend Under 28 U.S.C. § 1653, or, in the Alternative, Under Federal Rules of Civil Procedure 15(A) and 16(B) (the "Motion"). (Lead Case No. 2:18-CV-00462, Dkt. No. 107). Having considered the Motion, the Court finds that it should be **DENIED**.

I. BACKGROUND

On November 2, 2018, SIT filed its Original Complaint against Defendant Google, LLC (“Google”), which alleged that venue was proper in this District pursuant to 28 U.S.C. § 1400(b). (Member Case No. 2:18-CV-00463, Dkt. No. 1 ¶ 5). Relying on *SEVEN Networks, LLC v. Google LLC*,¹ SIT alleged that Google Cache Servers located in this District were a regular and established place of business both in its Original Complaint (*id.*) and its Amended Complaint (Lead Case No. 2:18-CV-00462, Dkt. No. 53 ¶ 5). (Lead Case No. 2:18-CV-00463, Dkt. No. 107 at 2). Google

¹ 315 F. Supp. 3d 933 (E.D. Tex. 2018), *mandamus denied*, *In re Google LLC*, No. 18-152, 2018 WL 5536478 (Fed. Cir. Oct. 29, 2018).

filed a Motion to Dismiss for Improper Venue Under Rule 12(b)(3) and 28 U.S.C. § 1406. (Member Case No. 2:18-CV-00463, Dkt. No. 13). On August 7, 2019, Court denied Google’s Motion. (Member Case No. 2:18-CV-00463, Dkt. No. 29). On September 18, 2019, Google filed a petition for a writ of mandamus at the Federal Circuit, requesting a mandate directing this Court to dismiss for improper venue. *In re Google LLC*, No. 19-126, Dkt. 2-1 at 32 (Fed. Cir. 2019). On February 13, 2020, a Federal Circuit panel concluded that this District “was not a proper venue because Google lacked a ‘regular and established place of business’ within the district since it has no employee or agent regularly conducting its business at its alleged ‘place of business’ within the district” and directed this Court to dismiss or transfer this case as appropriate under 28 U.S.C. § 1406(a). *In re Google LLC*, 949 F.3d 1338, 1347 (Fed. Cir. 2020).

The Court stayed this case on February 18, 2020 and continued the stay on March 17, 2020 pending a decision from the Federal Circuit on rehearing. (*See* Dkt. Nos. 102, 104). The Court ordered the parties to file a joint status report following any decision on rehearing. (Dkt. No. 104 at 1). The Federal Circuit denied SIT’s petition for rehearing on May 15, 2020. *In re Google LLC*, No. 19-126, Dkt. No. 50 (Fed. Cir. 2020).

On January 4, 2021,² SIT and Google filed a Joint Status Report (Dkt. No. 106) and SIT filed the instant Motion (Dkt. No. 107). In the Motion, SIT requests that in lieu of transfer or dismissal it be permitted to file an amended complaint containing alternative venue allegations in light of *In re Google LLC*, 823 Fed. App’x. 982 (Fed. Cir. 2020). (Dkt. No. 107).

² Despite the Court’s Order requiring the parties to file a status report following the Federal Circuit’s decision on rehearing, it was not until several months after the Federal Circuit’s decision, and at the Court’s direct prompting, that the parties eventually filed such a report; albeit several months late.

II. LEGAL STANDARD

A district court “has no power or authority to deviate from the mandate issued by an appellate court.” *Briggs v. Penn. R. Co.*, 334 U.S. 304, 306 (1948). “The inferior court is bound by the decree as the law of the case; and must carry it into execution, according to the mandate.” *Sibbald v. United States*, 37 U.S. 488, 492 (1838). “[B]oth the letter and the spirit of the mandate must be considered.” *Engel Indus., Inc. v. Lockformer Co.*, 166 F.3d 1379, 1383 (Fed. Cir. 1999) (internal citations omitted). “[O]n remand the district court ‘must implement both the letter and the spirit of the appellate court’s mandate and may not disregard the explicit directives of that court.’” *General Universal Sys., Inc. v. HAL, Inc.*, 500 F.3d 444, 453 (5th Cir. 2007) (internal citations omitted).

III. DISCUSSION

SIT argues: (1) the Federal Circuit’s order of mandamus does not preclude SIT from seeking leave to amend its complaint; (2) the Court should grant leave to amend under 28 U.S.C. § 1653; and (3) the Court should grant leave to amend under Federal Rules of Civil Procedure 15(a) and 16(b). (*See* Dkt. No. 107). In response, Google argues that the Federal Circuit’s mandate requires transfer or dismissal, SIT’s arguments do not override such mandate, and that SIT’s proposed amendment is untimely. (*See* Dkt. No. 108).

In certain circumstances, defective venue allegations may be cured by amendment to the pleadings. Rule 15(a) provides that “leave (to amend the complaint) shall be freely given when justice so requires.” Fed. R. Civ. P. 15(a); see also *Griggs v. Hinds Junior College*, 563 F.2d 179 (5th Cir. 1977). The Court further notes that Rule 16(b) allows the Court to modify the deadline to amend pleadings if good cause is shown. Fed. R. Civ. P. 16(b).

SIT raises the potential use of 28 U.S.C. § 1653 as grounds for amendment. 28 U.S.C. § 1653 permits amendment to cure “defective allegations of jurisdiction.” SIT cites *Moore v. Coats Co.*, in which the Third Circuit permitted amendment under § 1653 to cure defective venue allegations. (Dkt. No. 107 at 7) (270 F.2d 410 (3d Cir. 1959)). However, § 1653 is typically used to correct purely jurisdictional allegations, such as a lack of diversity of citizenship jurisdiction. *See, e.g., Whitmire v. Victus Ltd.*, 212 F.3d 885 (5th Cir. 2000).

Notwithstanding the above, the Court is ultimately bound by the Federal Circuit’s order directing it to dismiss or transfer the case pursuant to 28 U.S.C. § 1406(a). *In re Google LLC*, 949 F.3d at 1347. The Court finds that dismissal without prejudice is appropriate here.³

IV. CONCLUSION

For the foregoing reasons, the Court finds that the Motion should be and hereby is **DENIED**. It is **ORDERED** that all claims in the above-captioned cases are **DISMISSED WITHOUT PREJUDICE**. The Clerk of the Court is directed to **CLOSE** Member Case No. 2:18-CV-00463.⁴

So ORDERED and SIGNED this 12th day of March, 2021.


 RODNEY GILSTRAP
 UNITED STATES DISTRICT JUDGE

³ A dismissal for improper venue must be without prejudice to re-filing in an “appropriate district.” *Lowery v. Estelle*, 533 F.2d 265, 267 (5th Cir. 1976).

⁴ Lead Case No. 2:18-CV-00462 was previously closed. (Dkt. No. 88).

EXHIBIT 7

**IN THE UNITED STATES DISTRICT COURT
FOR THE ~~EASTERN~~WESTERN DISTRICT OF TEXAS
MARSHALLWACO DIVISION**

**SUPER INTERCONNECT
TECHNOLOGIES LLC,**

Plaintiff,

~~§§§§~~

~~JURY TRIAL DEMANDED~~

~~v.~~

~~§§§§~~

**HUAWEI DEVICE CO. LTD., HUAWEI
DEVICE (HONG KONG) CO., LTD, AND
HUAWEI DEVICE USA, INC.,**

~~§§§§~~

~~CIVIL ACTION NO. 2:18-cv-00462
(LEAD CASE)~~

**SUPER INTERCONNECT
TECHNOLOGIES LLC,**

~~§~~

~~§~~

~~§~~

**SUPER INTERCONNECT
TECHNOLOGIES LLC,**

Plaintiff,

~~§§§§§§§§§§~~

~~JURY TRIAL DEMANDED~~

~~v.~~

~~IT~~

GOOGLE LLC,

~~CIVIL ACTION NO. 2:18-cv-00463~~

Plaintiff Super Interconnect Technologies LLC (“Super Interconnect”) files this ~~First~~
~~Amended~~Original
Complaint against Google LLC (“Google”) for infringement of U.S. Patent No. 7,627,044 (“the
’044 patent”), U.S. Patent No. 6,463,092 (“the ’092 patent”), and U.S. Patent No. 7,158,593 (“the
’593 patent”).

THE PARTIES

1. Super Interconnect Technologies LLC is a Texas limited liability company, located at
~~at~~ 1701 Directors Blvd., Suite 300, Austin, Texas 78744.

2. On information and belief, Google LLC is a wholly-owned subsidiary of Alphabet, Inc. On information and belief, Google LLC is a limited liability company formed under the laws of the State of Delaware that has its principal place of business located at located at 1600 Amphitheatre Parkway, Mountain View, CA 94043. Google may be served with process through its registered agent, The Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808. Google does business in the State of Texas and in this District.

JURISDICTION AND VENUE

3. This action arises under the patent laws of the United States, namely 35 U.S.C.

§§ 271, 281, and 284-285, among others.

4. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

5. Venue is proper in this judicial district under 28 U.S.C. § 1400(b) because Google has committed acts of infringement in the District and has a regular and established place of business in this District. ~~On information and belief, multiple ISPs host Google Global Cache servers in this District, which cache Google's products and deliver them to residents of this District. These Google Global Cache servers cache content that includes video advertising, apps, and digital content from the Google Play store, among other things. Google generates revenue by providing these services to residents of this District. Both the server itself and the place of the Google Global Cache server, independently and together, constitute a "physical place" and a "~~including its ~~regular and established place of business" of Google. The Federal Circuit very recently denied mandamus to Google where it challenged this Court's ruling that venue was proper over it under 28 U.S.C. § 1400(b). See *In re Google LLC*, No. 2018-152, 2018 WL 5536478 (Fed. Cir. Oct. 29, 2018). at 500 W. 2nd St., Austin, TX 78701.~~

6. Google is subject to personal jurisdiction pursuant to due process due at least to its substantial business in this State, including: (A) at least part of its infringing activities alleged herein; and (B) regularly doing or soliciting business, engaging in other persistent conduct, and/or deriving substantial revenue from goods sold and services provided to Texas residents. Google has conducted and regularly conducts business within the United States and this District. Google has purposefully availed itself of the privileges of conducting business in the United States, and more specifically in Texas and this District. Google has sought protection and benefit from the laws of the State of Texas by placing infringing products into the stream of commerce through an established distribution channel with the awareness and/or intent that they will be purchased by consumers in this District.

7. On information and belief, Google has significant ties to, and presence in, this District, making venue in this judicial district both proper and convenient for this action.

COUNT I
(INFRINGEMENT OF U.S. PATENT NO. 7,627,044)

8. Super Interconnect incorporates paragraphs 1 through ~~7~~14 herein by reference.

9. Super Interconnect is the assignee of the '044 patent, entitled "Clock-Edge Modulated Serial Link with DC-Balance Control," with ownership of all substantial rights in the '044 patent, including the right to exclude others and to enforce, sue, and recover damages for past

and future infringement. A true and correct copy of the '044 patent is attached as Exhibit A.

10. The '044 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '044 patent issued from U.S. Patent Application No. 11/264,303.

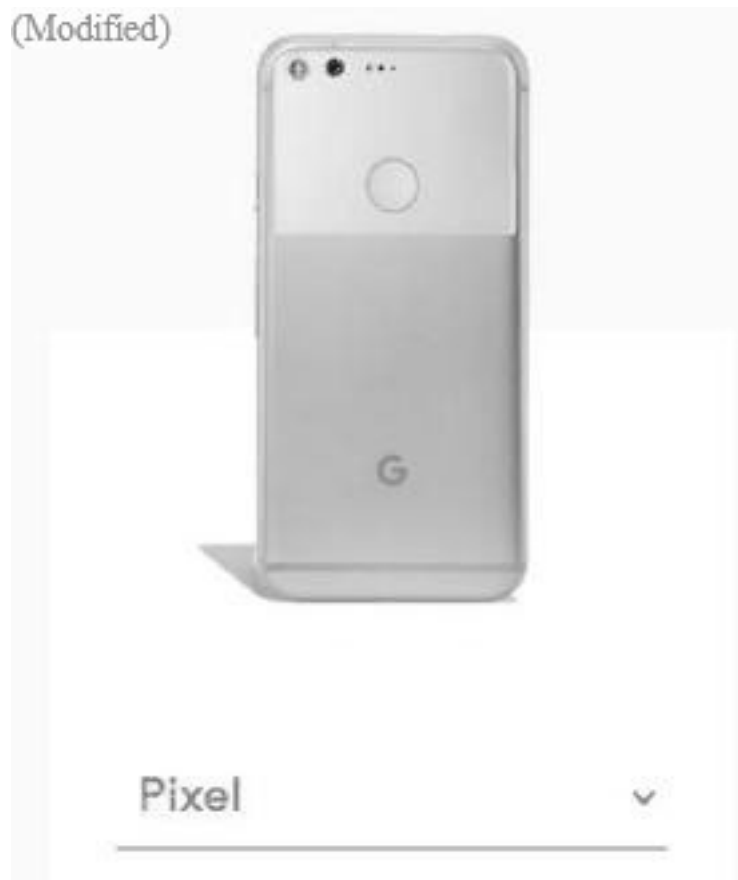
11. To the extent any marking or notice was required by 35 U.S.C. § 287, Super Interconnect and all predecessors-in-interest to the '044 patent have complied with the

Case: 22-104 Document: 2-2 Page: 254 Filed: 10/18/2021
requirements of that statute by providing actual or constructive notice to Google of its alleged infringement.

12. Google has and continues to directly and/or indirectly infringe (by inducing infringement and/or contributing to infringement) one or more claims of the '044 patent in this judicial district and elsewhere in the United States, including at least claims 1, 2, 8, 9, 10, 11, 12, 13, 14, 15 and 19, by, among other things, making, having made, using, offering for sale, selling, and/or importing electronic devices with Universal Flash Storage (UFS) that incorporate the fundamental technologies covered by the '044 patent. These products are referred to as the "'044 Accused Products." Examples of the '044 Accused Products include, but are not limited to, the Google Pixel and Google Pixel XL series of smartphones.

13. For example, the Google Pixel directly infringes claim 1 of the '044 patent, as shown in the below paragraphs.

14. An example of the Google Pixel is shown in the image below.



https://store.google.com/us/product/pixel_compare

15. Google incorporates UFS 2.0 storage in its Pixel family of products, as shown in the image below.

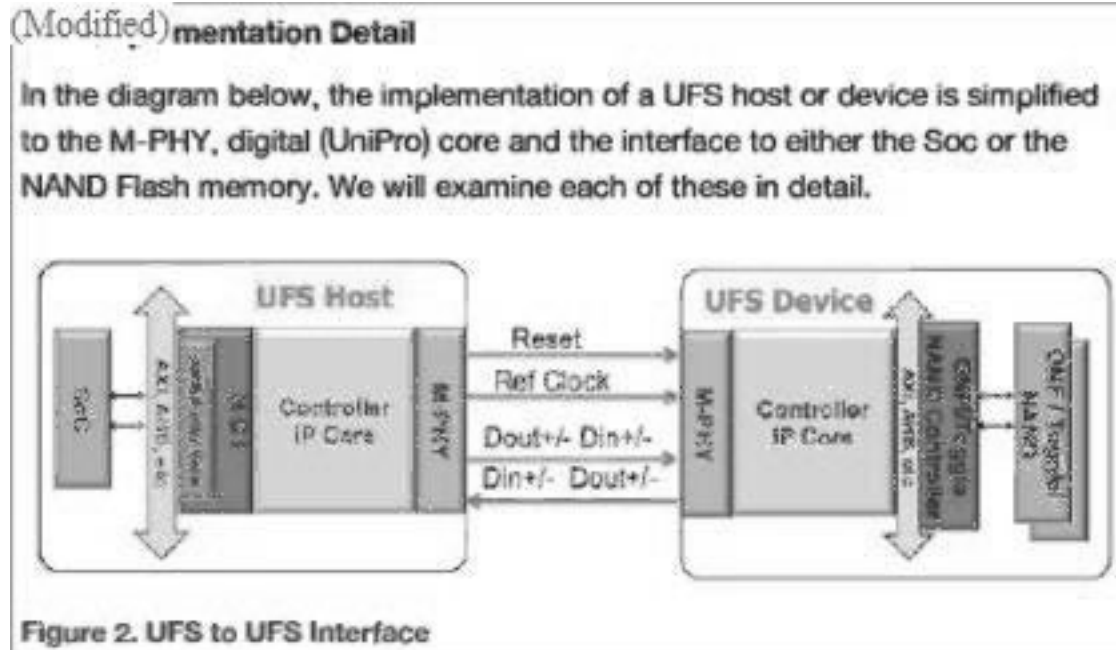
(Modified) The Pixel phones interesting, to me, is the relative lack of technical compromise. They have a fast processor. A fast camera (with improved and quicker HDR+). Fast storage (UFS 2.0). A fast fingerprint scanner. Fast software (they really are blazing-quick). Fast charging. Fast updates (seamless updates). A fast GPU (for VR). There is little about these phones you can point to and say Google cheated out on. And isn't that what so many of us have been demanding for years? A Google phone that could be positioned against the iPhone as legitimate competition (even if the iPhone does have its advantages - and disadvantages).

<http://www.androidpolice.com/2016/10/04/google-pixel-and-pixel-xl-hands-on-google-takes-on-the-iphone-by-becoming-the-iphone/>

16. The images below show that the Google Pixel's UFS storage uses the MIPI M-PHY protocol for physical layer communication between the UFS host and the UFS device.

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Arasan Chip Systems Inc. White Paper, “Universal Flash Storage: Mobilize Your Data” at 6 (Oct. 2012).

(Modified)

MIPI defines two types of M-PHY, type 1 and type 2. The UFS specification calls out type 1; M-PHY Type 1 uses NRZ signaling for HS and PWM signaling for LS, while type 2 uses NRZ signaling for both HS and LS.

UFS utilizes two speed modes, high-speed and low-speed. Low speed mode in Gear 1 is used upon power up or reset, then a transition occurs to high-speed gears for data transmission. The low speed gears and high-speed gears are listed here for your reference. UFS v1.1 has been ratified and supports HS Gear 2 running approximately @ 3Gbps per lane. The UFS spec also supports up to 4 lanes for higher throughput.

Id.

17. UFS hosts and devices, which are included in the '044 Accused Products, contain signal transmitters. These signal transmitters drive a DC-balanced differential signals for a communications channel. This signal is comprised of Those signals include a pair of data signals: a positive (true) data signal and a negative (complement) data signal (*see, e.g., Dout +/- and Din +/- in the Arasan figure above*). These transmitters include circuitry that multiplex a pulse-width modulated clock signal, a data signal, and control signals to apply them to the communications channel- node, allowing the UFS hosts and devices to communicate between each

[Link-to-previous setting changed from off in original to on in modified.]

~~Case 2:18-cv-00462-JRG Document 53 Filed 08/28/19 Page 9 of 20 PageID #: 472~~

other.

18. The '044 Accused Products thus include each and every limitation of claim 1 of the '044 patent; accordingly, they literally infringe this claim. Google directly infringes the '044 patent by making, using, offering to sell, selling, and/or importing the '044 Accused Products. Google is thereby liable for direct infringement.

19. During discovery and development of its infringement contentions, Plaintiff may provide additional theories under which Google infringes the '044 patent besides the example provided above, including for the same product and using the same components identified above, and nothing in the example above is meant to limit the infringement allegations of Plaintiff or limit the interpretations of the claims or their terms.

20. At a minimum, Google has known that the '044 Accused Products infringe the '044 patent at least as early as the service date of the Original Complaint, complaint in *Super Interconnect Techs. LLC v. Google LLC*, No. 2:18-cv-00463 (E.D. Tex.). During that litigation, Plaintiff repeatedly and explicitly set forth Google's infringement of the '044 patent via its Pixel phones' incorporation of UFS devices, including in a detailed expert report on infringement. Despite that clear evidence of infringement, Google has refused to take a license to the '044 patent and continues to willfully infringe the '044 patent. Additionally, Google continued to release new products (e.g., the Pixel 5 and 4a) that incorporate UFS devices. Google did so despite its knowledge that such devices would infringe the '044 patent and without taking a license the '044 patent. Google has made a business decision to flout the patent rights of Plaintiff despite its knowing infringement of the '044 patent, presumably relying on the significant advantage in resources that Google holds over Plaintiff.

21. Thus, despite having knowledge of the '044 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '044 patent, Google has nevertheless

continued its infringing conduct and disregarded an objectively high likelihood of infringement. Google's infringing activities relative to the '044 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

2122. Upon information and belief, since at least the above-mentioned date when Google was on notice of its infringement, Google has actively induced, under U.S.C. § 271(b), third-party manufacturers, distributors, importers and/or consumers that purchase or sell the '044 Accused Products that include all of the limitations of one or more claims of the '044 patent to directly infringe one or more claims of the '044 patent by making, having made, using, offering for sale, selling, and/or importing the '044 Accused Products. Since at least the notice provided on the above-mentioned date, Google does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '044 patent. Upon information and belief, Google intends to cause, and has taken affirmative steps to induce, infringement by these third-party manufacturers, distributors, importers, and/or consumers by, inter alia, creating advertisements that promote the infringing use of the '044 Accused Products, creating established distribution channels for the '044 Accused Products into and within the United States, manufacturing the '044

Accused Products in conformity with U.S. laws and regulations, distributing or making available instructions or manuals for these products to purchasers and prospective buyers, and/or providing technical support, replacement parts, or services for these products to these purchasers in the United States. For example, Google provides technical support for the Pixel on its own website at the following web address: <https://support.google.com/pixelphone#topic=91534467078250>.

~~22. On information and belief, despite having knowledge of the '044 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '044 patent since at least the above-mentioned date when Google was on notice of its infringement, Google has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Google's infringing activities relative to the '044 patent have been, and continue to be, willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.~~

23. Super Interconnect has been damaged as a result of Google's infringing conduct described in this Count. Google is, thus, liable to Super Interconnect in an amount that adequately compensates Super Interconnect for Google's infringement, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT II

(INFRINGEMENT OF U.S. PATENT NO. 6,463,092)

24. Super Interconnect incorporates paragraphs 1 through ~~22~~23 herein by reference.

25. Super Interconnect is the assignee of the '092 patent, entitled "System and Method for Sending and Receiving Data Signals Over A Clock Signal Line," with ownership of all substantial rights in the '092 patent, including the right to exclude others and to enforce, sue,

patent is attached as Exhibit B.

26. The '092 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '092 patent issued from U.S. Patent Application No. 09/393,235.

27. To the extent any marking or notice was required by 35 U.S.C. § 287, Super Interconnect and all predecessors-in-interest to the '092 patent have complied with the requirements of that statute by providing actual or constructive notice to Google of its alleged infringement.

28. Google has and continues to directly and/or indirectly infringe (by inducing infringement and/or contributing to infringement) one or more claims of the '092 patent in this judicial district and elsewhere in the United States, including at least claims 1, 2, 5, 10, and 11 by, among other things, making, having made, using, offering for sale, selling, and/or importing electronic devices with Universal Flash Storage (UFS) that incorporate the fundamental

technologies covered by the '092 patent. These products are referred to as the "'092 Accused Products." Examples of the '092 Accused Products include, but are not limited to, the Google Pixel and Google Pixel XL series of smartphones.

29. For example, the Google Pixel directly infringes claim 1 of the '029 patent, as shown in the below paragraphs.

30. An example of the Google Pixel is shown in the image below.



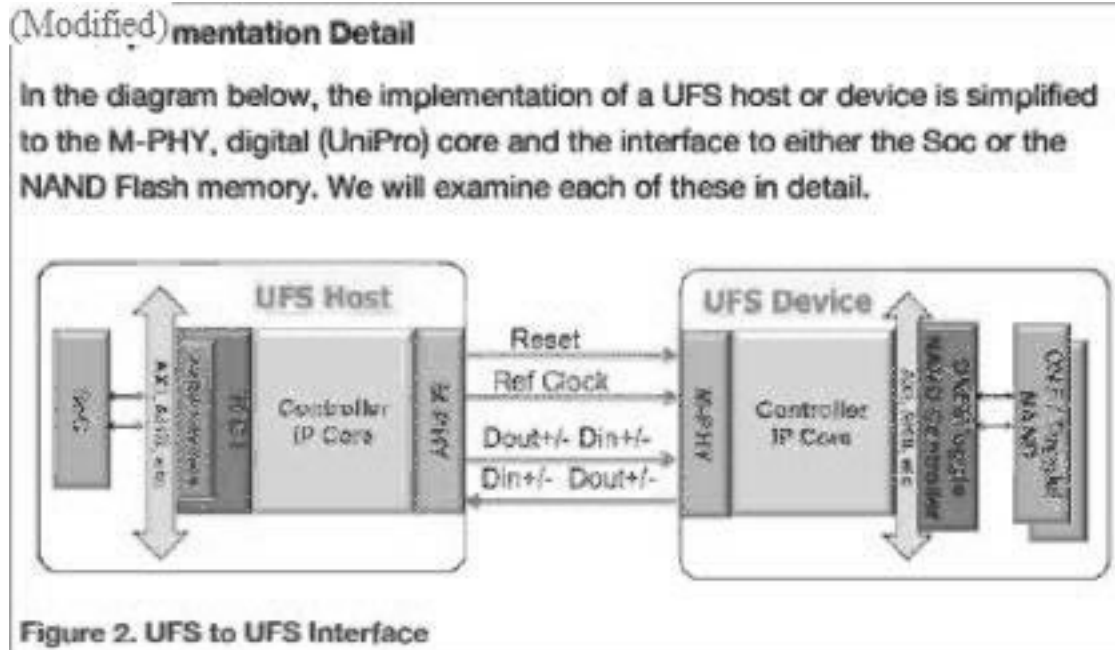
https://store.google.com/us/product/pixel_compare

31. Google incorporates UFS 2.0 storage in its Pixel family of products, as shown in the image below.

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<http://www.androidpolice.com/2016/10/04/google-pixel-and-pixel-xl-hands-on-google-takes-on-the-iphone-by-becoming-the-iphone/>

32. The images below show that the Google Pixel's UFS storage uses the MIPI M-PHY protocol for physical layer communication between the UFS host and the UFS device.



Arasan Chip Systems Inc. White Paper, “Universal Flash Storage: Mobilize Your Data” at 6 (Oct. 2012).

(Modified)

MIPI defines two types of M-PHY, type 1 and type 2. The UFS specification calls out type 1. M-PHY Type 1 uses NRZ signaling for HS and PWM signaling for LS, while type 2 uses NRZ signaling for both HS and LS.

UFS utilizes two speed modes, high-speed and low-speed. Low speed mode in Gear 1 is used upon power up or reset, then a transition occurs to high-speed gears for data transmission. The low speed gears and high-speed gears are listed here for your reference. UFS v1.1 has been ratified and supports HS Gear 2 running approximately @ 3Gbps per lane. The UFS spec also supports up to 4 lanes for higher throughput.

Id.

33. UFS hosts and devices, which are included in the '092 Accused Products, ~~multiplex~~transmit a clock and data signals for transmission over a single communications channel. This clock signal is modulated based on the data signal over a signal line, for example, according to the MIPI M-PHY protocol. To do so, the '092 Accused Products include a clock generator, with multiple inputs, modulating the falling edge of an output signal to indicate different data values, thus providing for data transmission between the UFS hosts and devices. And at least one of the inputs that the clock generator receives is a control signal indicating a data value to be transmitted before being combined with the output data stream.

34. The '092 Accused Products thus include each and every limitation of claim 1 of the '092 patent; accordingly, they literally infringe this claim. Google directly infringes the '092 patent

Google is thereby liable for direct infringement.

35. During discovery and development of its infringement contentions, Plaintiff may provide additional theories under which Google infringes the '092 patent besides the example provided above, including for the same product and using the same components identified above, and nothing in the example above is meant to limit the infringement allegations of Plaintiff or limit the interpretations of the claims or their terms.

36. At a minimum, Google has known that the '092 Accused Products infringe the '092 patent at least as early as the service date of the Original Complaint, complaint in *Super Interconnect Techs. LLC v. Google LLC*, No. 2:18-cv-00463 (E.D. Tex.). During that litigation, Plaintiff repeatedly and explicitly set forth Google's infringement of the '092 patent via its Pixel phones' incorporation of UFS devices, including in a detailed expert report on infringement. Despite that clear evidence of infringement, Google has refused to take a license to the '092 patent and continues to willfully infringe the '092 patent. Additionally, Google continued to release new products (e.g., the Pixel 5 and 4a) that incorporate UFS devices. Google did so despite its knowledge that such devices would infringe the '092 patent and without taking a license the '092 patent. Google has made a business decision to flout the patent rights of Plaintiff despite its knowing infringement of the '092 patent, presumably relying on the significant advantage in resources that Google holds over Plaintiff.

37. Thus, despite having knowledge of the '092 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '092 patent, Google has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Google's infringing activities relative to the '092 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

3738. Upon information and belief, since at least the above-mentioned date when Google was on notice of its infringement, Google has actively induced, under U.S.C. § 271(b), third-party manufacturers, distributors, importers and/or consumers that purchase or sell the '092 Accused Products that include all of the limitations of one or more claims of the '092 patent to directly

infringe one or more claims of the '092 patent by making, having made, using, offering for sale, selling, and/or importing the '092 Accused Products. Since at least the notice provided on the above-mentioned date, Google does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '092 patent. Upon information and belief, Google intends to cause, and has taken affirmative steps to induce, infringement by these third-party manufacturers, distributors, importers, and/or consumers by, inter alia, creating advertisements that promote the infringing use of the '092 Accused Products, creating established distribution channels for the '092 Accused Products into and within the United States, manufacturing the '092 Accused Products in conformity with U.S. laws and regulations, distributing or making available instructions or manuals for these products to purchasers and prospective buyers, and/or providing technical support, replacement parts, or services for these products to these purchasers in the United States. For example, Google provides technical support for the Pixel on its own website at the following web address: <https://support.google.com/pixelphone#topic=91534467078250>.

~~38. On information and belief, despite having knowledge of the '092 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '092 patent since at least the above-mentioned date when Google was on notice of its infringement, Google has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Google's infringing activities relative to the '092 patent have been, and continue to be, willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.~~

39. Super Interconnect has been damaged as a result of Google's infringing conduct described in this Count. Google is, thus, liable to Super Interconnect in an amount that adequately

compensates Super Interconnect for Google's infringement, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT III

(INFRINGEMENT OF U.S. PATENT NO. 7,158,593)

40. Super Interconnect incorporates paragraphs 1 through ~~37~~39 herein by reference.

41. Super Interconnect is the assignee of the '593 patent, entitled "Combining a Clock Signal and a Data Signal," with ownership of all substantial rights in the '593 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringement. A true and correct copy of the '593 patent is attached as Exhibit C.

42. The '593 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '593 patent issued from U.S. Patent Application No. 10/099,533.

43. To the extent any marking or notice was required by 35 U.S.C. § 287, Super Interconnect and all predecessors-in-interest to the '593 patent have complied with the requirements of that statute by providing actual or constructive notice to Google of its alleged infringement.

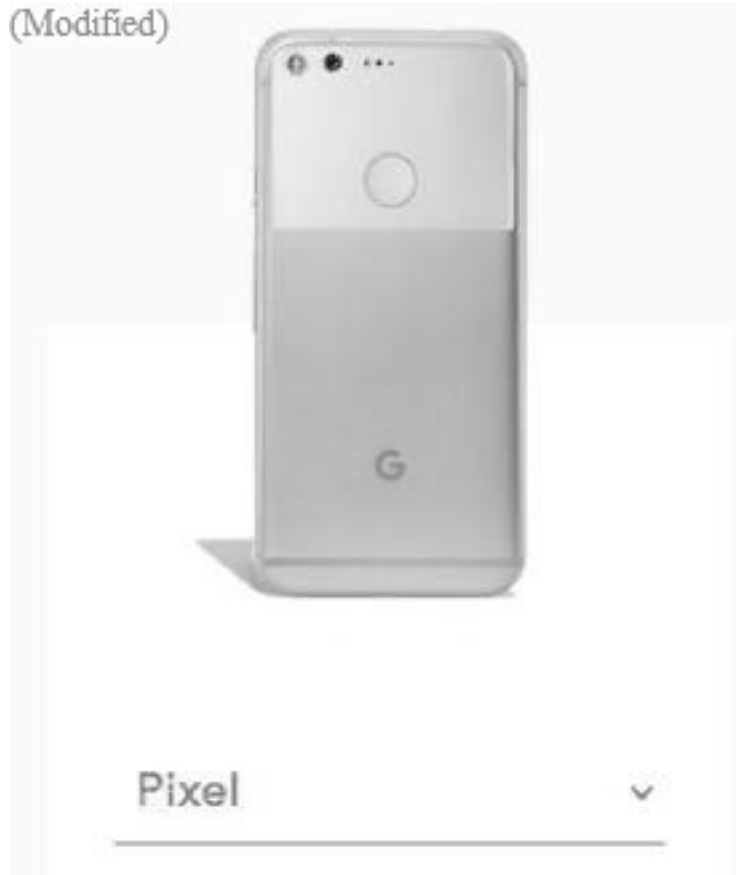
44. Google has and continues to directly and/or indirectly infringe (by inducing infringement and/or contributing to infringement) one or more claims of the '593 patent in this judicial district and elsewhere in the United States, including at least claims 34 and 35, by, among other things, making, having made, using, offering for sale, selling, and/or importing electronic devices with Universal Flash Storage (UFS) that incorporate the fundamental technologies covered by the '593 patent. These products are referred to as the "'593 Accused Products." Examples of the '593 Accused Products include, but are not limited to, the Google Pixel and Pixel XL series of smartphones.

45. The Google Pixel directly infringes claim 34 of the '593 patent, as shown in the below paragraphs.

46. An example of the Google Pixel is shown in the image below.

[Link-to-previous setting changed from off in original to on in modified.]

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https://store.google.com/us/product/pixel_compare

47. Google incorporates UFS 2.0 storage in its Pixel family of products, as shown in the image below.

(Modified) The Pixel phones interesting, to me, is the relative lack of technical compromise. They have a fast processor. A fast camera (with improved and quicker HDR+). Fast storage (UFS 2.0). A fast fingerprint scanner. Fast software (they really are blazing-quick). Fast charging. Fast updates (seamless updates). A fast GPU (for VR). There is little about these phones you can point to and say Google cheated out on. And isn't that what so many of us have been demanding for years? A Google phone that could be positioned against the iPhone as legitimate competition (even if the iPhone does have its advantages - and disadvantages).

<http://www.androidpolice.com/2016/10/04/google-pixel-and-pixel-xl-hands-on-google-takes-on-the-iphone-by-becoming-the-iphone/>

48. The images below show that the Google Pixel's UFS storage uses the MIPI M-PHY protocol for physical layer communication between the UFS host and the UFS device.

(Modified) **Implementation Detail**

In the diagram below, the implementation of a UFS host or device is simplified to the M-PHY, digital (UniPro) core and the interface to either the Soc or the NAND Flash memory. We will examine each of these in detail.

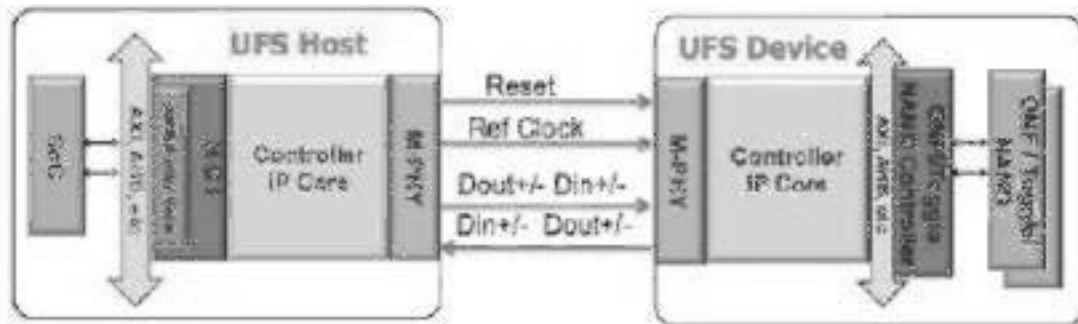


Figure 2. UFS to UFS Interface

Arasan Chip Systems Inc. White Paper, “Universal Flash Storage: Mobilize Your Data” at 6 (Oct. 2012).

(Modified)

MIPI defines two types of M-PHY, type 1 and type 2. The UFS specification calls out type 1. M-PHY Type 1 uses NRZ signaling for HS and PWM signaling for LS, while type 2 uses NRZ signaling for both HS and LS.

UFS utilizes two speed modes, high-speed and low-speed. Low speed mode in Gear 1 is used upon power up or reset, then a transition occurs to high-speed gears for data transmission. The low speed gears and high-speed gears are listed here for your reference. UFS v1.1 has been ratified and supports HS Gear 2 running approximately @ 3Gbps per lane. The UFS spec also supports up to 4 lanes for higher throughput.

Id.

49. UFS hosts and devices, which are included in the '593 Accused Products, contain signal transmitters, as shown for example in the *Arasan* figure above. These transmitters encode the data to be transmitted and further multiplex a pulse width modulated clock signal, ~~and generate~~ a combined a clock and encoded data signal, ~~and control signals to apply them to the communications channel.~~ The transmitters encode data and pulse width modulate the encoded data into the combined signal. This encoding scheme shifts an energy spectrum of the combined clock and encoded data signal away from an effective loop bandwidth of a clock recovery block.

50. The '593 Accused Products thus include each and every limitation of claim 34 of the '593 patent; accordingly, they literally infringe this claim. Google directly infringes the '593 patent by making, using, offering to sell, selling, and/or importing the '593 Accused Products. Google is thereby liable for direct infringement.

51. During discovery and development of its infringement contentions, Plaintiff may provide additional theories under which Google infringes the '593 patent besides the example provided above, including for the same product and using the same components identified above, and nothing in the example above is meant to limit the infringement allegations of Plaintiff or limit the interpretations of the claims or their terms.

52. At a minimum, Google has known that the '593 Accused Products infringe the '593 patent at least as early as the service date of the Original Complaint complaint in *Super Interconnect Techs. LLC v. Google LLC*, No. 2:18-cv-00463 (E.D. Tex.). During that litigation, Plaintiff repeatedly and explicitly set forth Google's infringement of the '593 patent via its Pixel phones' incorporation of UFS devices, including in a detailed expert report on infringement. Despite that clear evidence of infringement, Google has refused to take a license to the '593 patent and continues to willfully infringe the '593 patent. Additionally, Google continued to release new products (e.g., the Pixel 5 and 4a) that incorporate UFS devices. Google did so despite its knowledge that such devices would infringe the '593 patent and without taking a license the '593 patent. Google has made a business decision to flout the patent rights of Plaintiff despite its knowing infringement of the '593 patent, presumably relying on the significant advantage in resources that Google holds over Plaintiff.

53. Thus, despite having knowledge of the '593 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '593 patent, Google has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement.

Google's infringing activities relative to the '593 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

~~53~~54. Upon information and belief, since at least the above-mentioned date when Google was on notice of its infringement, Google has actively induced, under U.S.C. § 271(b), third-party manufacturers, distributors, importers and/or consumers that purchase or sell the '593 Accused Products that include all of the limitations of one or more claims of the '593 patent to directly infringe one or more claims of the '593 patent by making, having made, using, offering for sale, selling, and/or importing the '593 Accused Products. Since at least the notice provided on the above-mentioned date, Google does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '593 patent. Upon information and belief, Google intends to cause, and has taken affirmative steps to induce, infringement by these third-party manufacturers, distributors, importers, and/or consumers by, *inter alia*, creating advertisements that promote the infringing use of the '593 Accused Products, creating established distribution channels for the '593 Accused Products into and within the United States, manufacturing the '593

Accused Products in conformity with U.S. laws and regulations, distributing or making available instructions or manuals for these products to purchasers and prospective buyers, and/or providing technical support, replacement parts, or services for these products to these purchasers in the United States. For example, Google provides technical support for the Pixel on its own website at the following web address: <https://support.google.com/pixelphone#topic=9153446>.

~~54. On information and belief, despite having knowledge of the '593 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '593 patent since at least the above-mentioned date when Google was on notice of its infringement, Google has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Google's infringing activities relative to the '593 patent have been, and continue to be, willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.~~

55. Super Interconnect has been damaged as a result of Google's infringing conduct

described in this Count. Google is, thus, liable to Super Interconnect in an amount that adequately compensates Super Interconnect for Google's infringement, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

JURY DEMAND

Super Interconnect hereby requests a trial by jury pursuant to Rule 38 of the Federal Rules of Civil Procedure.

PRAYER FOR RELIEF

Super Interconnect requests that the Court find in its favor and against Google, and that

the Court grant ~~Google~~Super Interconnect the following relief:

- a. Judgment that one or more claims of the '044, '092, and '593 patents have been infringed, either literally and/or under the doctrine of equivalents, by Google and/or by others whose infringement has been induced by Google;
- b. Judgment that Google account for and pay to Super Interconnect all damages to and costs incurred by Super Interconnect because of Google's infringing activities and other conduct complained of herein;
- c. Judgment that Google account for and pay to Super Interconnect a reasonable, ongoing, post-judgment royalty because of Google's infringing activities and other conduct complained of herein;
- d. Judgment that Google's conduct warrants that the Court award increased damages up to treble damages pursuant to 35 U.S.C. § 284;
- e. ~~Judgement~~Judgment that Super Interconnect be granted pre-judgment and post-judgment interest on the damages caused by Google's infringing activities and other conduct complained of herein;
- f. Judgment and an order finding this to be an exceptional case and requiring Google to pay the costs of this action (including all disbursements) and attorneys' fees as provided by 35 U.S.C. § 285; and
- g. That Super Interconnect be granted such other and further relief as the Court may deem just and proper under the circumstances.

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~~Case 2:18-cv-00462-JRG Document 53 Filed 08/28/19 Page 31 of 20 PageID #: 473~~

DATED: ~~August 28~~March 15, 2019~~2021~~ Respectfully submitted,

/s/ T. William Kennedy Jr. Jeffrey R. Bragalone.

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Attorneys for Plaintiff

SUPER INTERCONNECT

TECHNOLOGIES

LLC

CERTIFICATE OF SERVICE

~~I hereby certify that on August 28, 2019, a true and correct copy of the foregoing document was served on all counsel of record via the Court's ECF system.~~

/s/ T. William Kennedy Jr.

T. William Kennedy
Jr.

PLA

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Summary report:	
Litera® Change-Pro for Word 10.8.2.11 Document comparison done on 3/22/2021 6:49:22 PM	
Style name: Default Style	
Intelligent Table Comparison: Active	
Original filename: D.I. 53 - Amended Complaint as to Google.pdf	
Modified filename: 2021.03.15 [001] Complaint.pdf	
Changes:	
Add	100
Delete	106
Move From	0
Move To	0
Table Insert	0
Table Delete	1
Table moves to	0
Table moves from	0
Embedded Graphics (Visio, ChemDraw, Images etc.)	12
Embedded Excel	0
Format changes	0
Total Changes:	219

EXHIBIT 8

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

**SUPER INTERCONNECT
TECHNOLOGIES LLC,**

Plaintiff,

v.

**HUAWEI DEVICE (SHENZHEN) CO.,
LTD., HUAWEI DEVICE
(DONGGUAN) CO., LTD., and
HUAWEI DEVICE USA, INC.,**

Defendants.

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JURY TRIAL DEMANDED

**CIVIL ACTION NO. 2:18-cv-00462
(LEAD CASE)**

2:18-cv-00463

**PLAINTIFF'S NOTICE OF SUBPOENA TO QUALCOMM INC.
TO PRODUCE DOCUMENTS AND TESTIFY IN A DEPOSITION**

PLEASE TAKE NOTICE that pursuant to Rule 45 of the Federal Rules of Civil Procedure, Plaintiff Super Interconnect LLC requests the deposition testimony of and document production from Qualcomm Inc. pursuant to the subpoena attached as Exhibit 1. The topics of the deposition testimony and the requests for production are described in Appendix A of the subpoena. The deposition shall take place at 9:00 a.m. on July 12, 2019, at DAVINCI, Rancho Bernardo Business Center, 11440 West Bernardo Court, San Diego, CA 92127 or at a location to be mutually agreed upon. If that date is unavailable for Qualcomm Inc., Plaintiff will make all reasonable attempts to accommodate a more convenient date.

DATED: June 17, 2019

Respectfully submitted,

/s/ T. William Kennedy Jr.

Jeffrey R. Bragalone

State Bar No. 02855775

T. William Kennedy Jr.

State Bar No. 24055771

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Attorneys for Plaintiff

SUPER INTERCONNECT

TECHNOLOGIES LLC

CERTIFICATE OF SERVICE

The undersigned hereby certifies that all counsel of record are being served with a true and correct copy of the foregoing document via electronic mail on this 17th day of June, 2019.

/s/ T. William Kennedy

EXHIBIT 1

UNITED STATES DISTRICT COURT

for the

Eastern District of Texas

SUPER INTERCONNECT TECHNOLOGIES LLC

Plaintiff

v.

Huawei Device Co. Ltd., et al

Defendant

Civil Action No. 2:18-cv-00462 (LEAD CASE)

2:18-cv00463

SUBPOENA TO TESTIFY AT A DEPOSITION IN A CIVIL ACTION

To: QUALCOMM INCORPORATED, C/O PRENTICE HALL CORP SYSTEM, 211 E. 7TH STREET, SUITE 620,
AUSTIN, TEXAS 78701-3218

(Name of person to whom this subpoena is directed)

☒ **Testimony:** **YOU ARE COMMANDED** to appear at the time, date, and place set forth below to testify at a deposition to be taken in this civil action. If you are an organization, you must designate one or more officers, directors, or managing agents, or designate other persons who consent to testify on your behalf about the following matters, or those set forth in an attachment:

Place: DAVINCI, Rancho Bernardo Business Center, 11440
West Bernardo Court, San Diego, CA 92127
(OR OTHER MUTUALLY AGREED UPON LOCATION)

Date and Time:

07/12/2019 9:00 am

The deposition will be recorded by this method: STENOGRAPHICALLY, VIDEOTAPE AND REALTIME

☒ **Production:** You, or your representatives, must also bring with you to the deposition the following documents, electronically stored information, or objects, and must permit inspection, copying, testing, or sampling of the material: SEE ATTACHMENT A ATTACHED HERETO. DOCUMENTS DUE 7/8/2019 TO BKENNEDY@BCPC-LAW.COM

The following provisions of Fed. R. Civ. P. 45 are attached – Rule 45(c), relating to the place of compliance; Rule 45(d), relating to your protection as a person subject to a subpoena; and Rule 45(e) and (g), relating to your duty to respond to this subpoena and the potential consequences of not doing so.

Date: 06/17/2019

CLERK OF COURT

OR

/s/T. WILLIAM KENNEDY

Signature of Clerk or Deputy Clerk

Attorney's signature

The name, address, e-mail address, and telephone number of the attorney representing (name of party) SUPER INTERCONNECT TECHNOLOGIES LLC

, who issues or requests this subpoena, are:
T. WILLIAM KENNEDY, BRAGALONE CONROY PC, 2200 ROSS AVENUE, SUITE 4500W, DALLAS, TEXAS 75201
(214) 785-6670 BKENNEDY@BCPC-LAW.COM

Notice to the person who issues or requests this subpoena

If this subpoena commands the production of documents, electronically stored information, or tangible things before trial, a notice and a copy of the subpoena must be served on each party in this case before it is served on the person to whom it is directed. Fed. R. Civ. P. 45(a)(4).

Civil Action No. 2:18-cv-00462 (LEAD CASE)

PROOF OF SERVICE*(This section should not be filed with the court unless required by Fed. R. Civ. P. 45.)*

I received this subpoena for *(name of individual and title, if any)* _____
 on *(date)* _____ .

☐ I served the subpoena by delivering a copy to the named individual as follows: _____
 _____ on *(date)* _____ ; or

☐ I returned the subpoena unexecuted because: _____
 _____ .

Unless the subpoena was issued on behalf of the United States, or one of its officers or agents, I have also
 tendered to the witness the fees for one day's attendance, and the mileage allowed by law, in the amount of
 \$ _____ .

My fees are \$ _____ for travel and \$ _____ for services, for a total of \$ 0.00 .

I declare under penalty of perjury that this information is true.

Date: _____

Server's signature

Printed name and title

Server's address

Additional information regarding attempted service, etc.:

Federal Rule of Civil Procedure 45 (c), (d), (e), and (g) (Effective 12/1/13)**(c) Place of Compliance.**

(1) For a Trial, Hearing, or Deposition. A subpoena may command a person to attend a trial, hearing, or deposition only as follows:

- (A) within 100 miles of where the person resides, is employed, or regularly transacts business in person; or
- (B) within the state where the person resides, is employed, or regularly transacts business in person, if the person
 - (i) is a party or a party's officer; or
 - (ii) is commanded to attend a trial and would not incur substantial expense.

(2) For Other Discovery. A subpoena may command:

- (A) production of documents, electronically stored information, or tangible things at a place within 100 miles of where the person resides, is employed, or regularly transacts business in person; and
- (B) inspection of premises at the premises to be inspected.

(d) Protecting a Person Subject to a Subpoena; Enforcement.

(1) Avoiding Undue Burden or Expense; Sanctions. A party or attorney responsible for issuing and serving a subpoena must take reasonable steps to avoid imposing undue burden or expense on a person subject to the subpoena. The court for the district where compliance is required must enforce this duty and impose an appropriate sanction—which may include lost earnings and reasonable attorney's fees—on a party or attorney who fails to comply.

(2) Command to Produce Materials or Permit Inspection.

(A) *Appearance Not Required.* A person commanded to produce documents, electronically stored information, or tangible things, or to permit the inspection of premises, need not appear in person at the place of production or inspection unless also commanded to appear for a deposition, hearing, or trial.

(B) *Objections.* A person commanded to produce documents or tangible things or to permit inspection may serve on the party or attorney designated in the subpoena a written objection to inspecting, copying, testing, or sampling any or all of the materials or to inspecting the premises—or to producing electronically stored information in the form or forms requested. The objection must be served before the earlier of the time specified for compliance or 14 days after the subpoena is served. If an objection is made, the following rules apply:

- (i) At any time, on notice to the commanded person, the serving party may move the court for the district where compliance is required for an order compelling production or inspection.
- (ii) These acts may be required only as directed in the order, and the order must protect a person who is neither a party nor a party's officer from significant expense resulting from compliance.

(3) Quashing or Modifying a Subpoena.

(A) *When Required.* On timely motion, the court for the district where compliance is required must quash or modify a subpoena that:

- (i) fails to allow a reasonable time to comply;
- (ii) requires a person to comply beyond the geographical limits specified in Rule 45(c);
- (iii) requires disclosure of privileged or other protected matter, if no exception or waiver applies; or
- (iv) subjects a person to undue burden.

(B) *When Permitted.* To protect a person subject to or affected by a subpoena, the court for the district where compliance is required may, on motion, quash or modify the subpoena if it requires:

(i) disclosing a trade secret or other confidential research, development, or commercial information; or

(ii) disclosing an unretained expert's opinion or information that does not describe specific occurrences in dispute and results from the expert's study that was not requested by a party.

(C) *Specifying Conditions as an Alternative.* In the circumstances described in Rule 45(d)(3)(B), the court may, instead of quashing or modifying a subpoena, order appearance or production under specified conditions if the serving party:

- (i) shows a substantial need for the testimony or material that cannot be otherwise met without undue hardship; and
- (ii) ensures that the subpoenaed person will be reasonably compensated.

(e) Duties in Responding to a Subpoena.

(1) Producing Documents or Electronically Stored Information. These procedures apply to producing documents or electronically stored information:

(A) *Documents.* A person responding to a subpoena to produce documents must produce them as they are kept in the ordinary course of business or must organize and label them to correspond to the categories in the demand.

(B) *Form for Producing Electronically Stored Information Not Specified.* If a subpoena does not specify a form for producing electronically stored information, the person responding must produce it in a form or forms in which it is ordinarily maintained or in a reasonably usable form or forms.

(C) *Electronically Stored Information Produced in Only One Form.* The person responding need not produce the same electronically stored information in more than one form.

(D) *Inaccessible Electronically Stored Information.* The person responding need not provide discovery of electronically stored information from sources that the person identifies as not reasonably accessible because of undue burden or cost. On motion to compel discovery or for a protective order, the person responding must show that the information is not reasonably accessible because of undue burden or cost. If that showing is made, the court may nonetheless order discovery from such sources if the requesting party shows good cause, considering the limitations of Rule 26(b)(2)(C). The court may specify conditions for the discovery.

(2) Claiming Privilege or Protection.

(A) *Information Withheld.* A person withholding subpoenaed information under a claim that it is privileged or subject to protection as trial-preparation material must:

- (i) expressly make the claim; and
- (ii) describe the nature of the withheld documents, communications, or tangible things in a manner that, without revealing information itself privileged or protected, will enable the parties to assess the claim.

(B) *Information Produced.* If information produced in response to a subpoena is subject to a claim of privilege or of protection as trial-preparation material, the person making the claim may notify any party that received the information of the claim and the basis for it. After being notified, a party must promptly return, sequester, or destroy the specified information and any copies it has; must not use or disclose the information until the claim is resolved; must take reasonable steps to retrieve the information if the party disclosed it before being notified; and may promptly present the information under seal to the court for the district where compliance is required for a determination of the claim. The person who produced the information must preserve the information until the claim is resolved.

(g) Contempt.

The court for the district where compliance is required—and also, after a motion is transferred, the issuing court—may hold in contempt a person who, having been served, fails without adequate excuse to obey the subpoena or an order related to it.

ATTACHMENT A

DEFINITIONS

1. The term “you,” “your,” and “Qualcomm” refers to Qualcomm Incorporated, including all of its corporate locations, and all predecessors, subsidiaries, parents and affiliates, foreign and domestic, and all past or present directors, officers, agents, representatives, employees, consultants, attorneys, entities acting in joint-venture or partnership relationships with it, and others acting on its behalf.

2. The term “SIT” and/or “plaintiff” means Super Interconnect Technologies LLC, including all of its corporate locations, and all predecessors, subsidiaries, parents and affiliates, and all past or present directors, officers, agents, representatives, employees, consultants, attorneys, entities acting in joint-venture or partnership relationships with it, and others acting on its behalf.

3. The term “Google” refers to Google LLC, including all of its corporate locations, and all predecessors, subsidiaries, parents and affiliates, foreign and domestic, and all past or present directors, officers, agents, representatives, employees, consultants, attorneys, entities acting in joint-venture or partnership relationships with it, and others acting on its behalf.

4. The term “Huawei” refers to Huawei Device Co. Ltd., Huawei Device (Hong Kong) Co., Ltd. and Huawei Device USA, Inc., collectively and separately, including all of their corporate locations, and all predecessors, subsidiaries, parents and affiliates, foreign and domestic, and all past or present directors, officers, agents, representatives, employees, consultants, attorneys, entities acting in joint-venture or partnership relationships with them, and others acting on their behalf.

5. The “Defendants” include Google and Huawei, separately and collectively.

6. The term “Litigations” means any and all of the civil actions styled *Super Interconnect Technologies LLC v. Google LLC*, No. 2:18-CV-463 and *Super Interconnect Technologies LLC v. Huawei Device Co. Ltd. et al.*, No. 2:18-CV-462, both filed in the Eastern District of Texas on November 2, 2018; *Super Interconnect Technologies LLC v. ZTE Corp. et al.*, No. 3:18-CV-02932, filed in the Northern District of Texas on November 2, 2018; *Super Interconnect Technologies LLC v. Lenovo Group Ltd. et al.*, No. 1:18-CV-01729, *Super Interconnect Technologies LLC v. Motorola Mobility LLC*, No. 1:18-CV-01730, *Super Interconnect Technologies LLC v. Sony Corp. et al.*, No. 1:18-CV-01731, all filed in the District of Delaware on November 2, 2018; and *Super Interconnect Technologies LLC v. HP Inc.*, No. 1:19-CV-00169, filed in the District of Delaware on January 29, 2019.

7. The term “UFS” means Universal Flash Storage. The term “UFS Standard” means the JEDEC Standard for UFS, including JESD220D and any of its predecessor or successor standards.

8. The term “M-PHY Standard” means the MIPI Alliance Specification for M-PHY Version 4.0 and any of its predecessor or successor standards.

9. The term “Technical Description” means, at a minimum, information sufficient to provide one of ordinary skill in the art an understanding of the details of the technological functions at issue and the components that perform those functions. If a product or component operates in multiple ways, then this definition covers each of the different ways the product operates.

10. The terms “document” or “documents” are used herein in their customary broad sense, and mean any kind of printed, recorded, written, graphic, or photographic matter (including tape recordings), however printed, produced, reproduced, coded or stored, of any kind

or description, whether sent or received or not, including originals, copies, drafts, and both sides thereof, and including papers, books, charts, graphs, photographs, drawings, correspondence, telegrams, cables, telex messages, memoranda, notes, notations, work papers, routing slips, intra and inter-office communications, electronic mail, affidavits, statements, opinions, court pleadings, reports, indices, studies, analyses, forecasts, evaluations, contracts, computer printouts, data processing input and output, computer programs, microfilms, microfiche, all other records kept by electronic, photographic, or mechanical means, and things similar to any of the foregoing, regardless of their author or origin, or any kind. The term “document” as used herein is intended to include the broadest possible definition under Federal Rule of Civil Procedure 34.

11. The term “communications” and any derivative of it means any transmission of information between or among two or more persons, by written, oral or any other means, including, without limitation, personal, telephonic, written, email, facsimile, telex, telegram, text messaging, Twitter, Facebook, and any other means.

12. The terms “and” and “or” are terms of inclusion and not of exclusion and are to be construed either disjunctively or conjunctively as necessary to bring within the scope of these requests any information which might be construed to be outside their scope.

13. The singular shall include the plural and vice versa.

14. The term “any” includes “all” and “all” includes “any” and “includes” or “including” means “including, but not limited to.”

15. The phrases “related to” or “relating to” mean refer to, concern, mention, reflect, summarize, evidence, involve, describe, discuss, respond to, support, contradict, constitute, or comment on, in whole or in part.

16. The terms “including” means “including without limitation,” as appropriate, so as

to bring within the scope of the requests all responses that might otherwise be construed to be outside of its scope. The term “all” means “any and all,” as appropriate.

DEPOSITION TOPICS

TOPIC NO. 1:

For each Defendant, the identity and quantity of each processor that You import, make, have made for You, or sell that is able interface with UFS. This includes both past and present acts as well as any future plans.

TOPIC NO. 2:

The cost per processor of each processor identified in Topic 1.

TOPIC NO. 3:

For all transmissions of signals to UFS memory from each processor responsive to Topic 1, each step, in order, of encoding, modulating, multiplexing, serializing, de-serializing, or any other processing of data, control, and/or clock signals performed before and during transmission of the signals and the identity of each component that performs that step. And the same for the reverse direction of transmission of signals, *i.e.*, from UFS memory to processor.

TOPIC NO. 4:

For all transmissions of signals to UFS memory from each processor responsive to Topic 1, the identity of all source signals that contribute to the transmitted signals and how they contribute to the transmitted signals. Examples of source signals include, but are not limited to, the “TX_BitClk,” “TX_SymbolClk,” “TX_ProtDORDY,” “TX_DataNCtrl,” “TX_Symbol,” and “TX_Burst” signals shown in Figure 66 (M-TX Signal Interfaces Diagram) in the M-PHY Specification. And the same for the reverse direction of transmission of signals, *i.e.*, from UFS memory to processor.

TOPIC NO. 5:

All communications with the Defendant(s) relating to the Litigations.

TOPIC NO. 6:

Any indemnity agreements with the Defendants relating to the Litigations.

TOPIC NO. 7:

All communications with Defendants relating to compliance with either the UFS Standard or the M-PHY Standard.

TOPIC NO. 8:

The efforts undertaken by You to ensure that the processors responsive to Topic 1 comply with the UFS Standard and the M-PHY Standard.

TOPIC NO. 9:

All documents discussing or promoting that the processors relevant to Topic 1 can interface with or support UFS memory.

REQUESTS FOR PRODUCTION

REQUEST NO. 1:

For each Defendant, documents sufficient to identify each processor and its quantity that You import, make, have made for You, or sell that is able interface with UFS. This includes both past and present acts as well as any future plans.

REQUEST NO. 2:

Documents sufficient to show the cost per processor of each processor identified in Request No. 1.

REQUEST NO. 3:

For all transmissions of signals to UFS memory from each processor responsive to Request No. 1, documents sufficient to provide a Technical Description, in order, of each step of encoding, modulating, multiplexing, serializing, de-serializing, or any other processing of data, control, and/or clock signals performed before and during transmission of the signals and sufficient to identify each component that performs that step. And the same for the reverse direction of transmission of signals, *i.e.*, from UFS memory to processor.

REQUEST NO. 4:

For all transmissions of signals to UFS memory from each processor responsive to Request No. 1, documents sufficient to identify all source signals that contribute to the transmitted signals and sufficient to provide a Technical Description of how they contribute to the transmitted signals. Examples of source signals include, but are not limited to, the “TX_BitClk,” “TX_SymbolClk,” “TX_ProtDORDY,” “TX_DataNCtrl,” “TX_Symbol,” and “TX_Burst” signals shown in Figure

66 (M-TX Signal Interfaces Diagram) in the M-PHY Specification. And the same for the reverse direction of transmission of signals, *i.e.*, from UFS memory to processor.

REQUEST NO. 5:

All communications with the Defendant(s) relating to the Litigations.

REQUEST NO. 6:

Any indemnity agreements with the Defendants relating to the Litigations.

REQUEST NO. 7:

All communications with Defendants relating to compliance with either the UFS Standard or the M-PHY Standard.

REQUEST NO. 8:

Any documents demonstrating the efforts undertaken by You to ensure that the processors relevant to Request No. 1 comply with the UFS Standard and the M-PHY Standard.

REQUEST NO. 9:

All documents discussing or promoting that the processors relevant to Request No. 1 can interface with or support UFS memory.

EXHIBIT 15

Contact

www.linkedin.com/in/harleen-juneja
(LinkedIn)

Top Skills

Requirements Analysis

C++

C

Harleen Juneja

Product TPM at Facebook ; ex-Google ; ex-IBM
Menlo Park

Summary

Technical Program manager with expertise ranging from mobile apps to platform. Attention to detail and skilled in coordinating proactively with diverse teams and resources to complete objectives.

Strong program and project management professional skilled in SQL, Agile Processes, Requirements Analysis, C, and C++.

Prior to being a technical program manager was a software engineer at IBM.

BS and MS in computer sciences.

Experience

Facebook

Product TPM

February 2021 - Present (2 months)

Menlo Park, California, United States

Google

Technical Program Manager

2016 - January 2021 (5 years)

Mountain View, California

Technical Program owner for Storage (UFS and F2FS) for Pixel 3 to Pixel 5.

Worked across supply management, hardware and software stakeholders to create vendor selection criteria, prioritize part performance and stability.

Technical program manager for pixel touch and haptics experience for pixel 3 to 5.

Engineering productivity program owner for android platform quality media framework and Pixel camera app and framework.

eTouch Systems

Test Engineer

2015 - 2016 (1 year)

Mountain View, California

--> Maintaining quality for key functional partnerships across activity recognition, sensor and wear teams to gather requirements, define milestone, ensure readiness, identify risks and gain required approvals.

IBM

Software Engineer - ISL (Indian Software Labs)

2010 - February 2012 (2 years)

Bengaluru, Karnataka, India

Developed new features and fixed bugs for IBM's flagship retail domain product 'Product Information Management' deployed across major retailers in the world.

--> As part of Sustenance engineering team, resolved customer reported issues (Authorized Program Analysis Reports - APARs), by developing code fixes.

--> Developed extensive Java APIs for large customers such as Walmart, Target etc to enable customization of their inventory management workflows

--> Increased test coverage by 50% by developing Junit based unit test improving code stability and also developed a new integration testing framework to prevent regressions.

--> Collaborated with Level 2 support teams and retail customers in investigating field reported issues and provided fixes/workarounds. Achieved 100% SLA of 1day turnaround for Severity1 issues, 2days for Severity2 issues etc)

--> Co-ordinated with global teams such as Quality Analysis and Information Development teams to gather customer requirements for future feature releases.

Education

Punjab Engineering College

ME, Computer Science Engineering · (2007 - 2009)

Guru Nanak Dev Engineering College, Ludhiana

Bachelor of Engineering - BE, Information Technology · (2003 - 2007)

EXHIBIT 16

9D5243 2 000

TX2020 05-102
Ver. 11.0 (Rev.9-15/33)

Texas Franchise Tax Public Information Report

To be filed by Corporations, Limited Liability Companies (LLC), Limited Partnerships (LP),
Professional Associations (PA) and Financial Institutions

Tcode 13196

Taxpayer number

Report year

You have certain rights under Chapter 552 and 559,
Government Code, to review, request and correct information
we have on file about you. Contact us at 1-800-252-1381.

32051885955		2020	
Taxpayer name SUPER INTERCONNECT TECHNOLOGIES LLC		<input checked="" type="checkbox"/> Blacken box if the mailing address has changed.	
Mailing address 6136 FRISCO SQUARE BLVD., SUITE 400		Secretary of State (SOS) file number or Comptroller file number	
City FRISCO	State TX	ZIP code plus 4	75034

☒ Blacken box if there are currently no changes from previous year; if no information is displayed, complete the applicable information in Sections A, B and C.

Principal office

Principal place of business

You must report officer, director, member, general partner and manager information as of the date you complete this report.

Please sign below! This report must be signed to satisfy franchise tax requirements.

3205188595520

SECTION A Name, title and mailing address of each officer, director, member, general partner or manager.

Name	Title	Director <input type="checkbox"/> YES	Term expiration	m m d d y y
Mailing address	City	State	ZIP Code	
Name	Title	Director <input type="checkbox"/> YES	Term expiration	m m d d y y
Mailing address	City	State	ZIP Code	
Name	Title	Director <input type="checkbox"/> YES	Term expiration	m m d d y y
Mailing address	City	State	ZIP Code	

SECTION B Enter information for each corporation, LLC, LP, PA or financial institution, if any, in which this entity owns an interest of 10 percent or more.

Name of owned (subsidiary) corporation, LLC, LP, PA or financial institution	State of formation	Texas SOS file number, if any	Percentage of ownership
Name of owned (subsidiary) corporation, LLC, LP, PA or financial institution	State of formation	Texas SOS file number, if any	Percentage of ownership

SECTION C Enter information for each corporation, LLC, LP, PA or financial institution, if any, that owns an interest of 10 percent or more in this entity.

Name of owned (parent) corporation, LLC, LP, PA or financial institution	State of formation	Texas SOS file number, if any	Percentage of ownership
--	--------------------	-------------------------------	-------------------------

Registered agent and registered office currently on file (see instructions if you need to make changes)

Agent:

You must make a filing with the Secretary of State to change registered
agent, registered office or general partner information.

Office:	City	State	ZIP Code
---------	------	-------	----------

The information on this form is required by Section 171.203 of the Tax Code for each corporation, LLC, LP, PA or financial institution that files a Texas Franchise Tax Report. Use additional
sheets for Sections A, B and C, if necessary. The information will be available for public inspection.I declare that the information in this document and any attachments is true and correct to the best of my knowledge and belief, as of the date below, and that a copy of this report has
been mailed to each person named in this report who is an officer, director, member, general partner or manager and who is not currently employed by this or a related corporation,
LLC, LP, PA or financial institution.

sign here	Title Controller	Date 11/11/2020	Area code and phone number
--------------	---------------------	--------------------	----------------------------

Texas Comptroller Official Use Only

VE/DE	<input type="checkbox"/>	PIR IND	<input type="checkbox"/>
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7001

EXHIBIT 20

SECURITIES & EXCHANGE COMMISSION EDGAR FILING**ACACIA RESEARCH CORP****Form: 10-K****Date Filed: 2020-03-16**

Corporate Issuer CIK: 934549

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-K

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

FOR THE FISCAL YEAR ENDED DECEMBER 31, 2019

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
FOR THE TRANSITION PERIOD FROM TO .

Commission File Number 001-37721



RESEARCH CORPORATION
(Exact name of registrant as specified in its charter)

DELAWARE

(State or other jurisdiction of
incorporation organization)

95-4405754

(I.R.S. Employer
Identification No.)

4 PARK PLAZA, SUITE 550

IRVINE, CA

(Address of principal executive offices)

92614

(Zip Code)

Registrant's telephone number, including area code: **(949) 480-8300**

Securities registered pursuant to Section 12(b) of the Act:

<u>Title of Each Class</u>	<u>Trading Symbol(s)</u>	<u>Name of Each Exchange on Which Registered</u>
Common Stock, \$0.001 par value	ACTG	The NASDAQ Stock Market, LLC

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☐ No ☒

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act:

Large accelerated filer ☐
Non-accelerated filer ☐

Accelerated filer ☒
Smaller reporting company ☒
Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ☐ No ☒

The aggregate market value of the registrant's voting and non-voting common stock held by non-affiliates of the registrant on June 30, 2019, the last business day of the registrant's most recently completed second fiscal quarter, computed by reference to the last sale price of the registrant's common stock as

reported by The Nasdaq Global Select Market on such date, was approximately \$147,673,000. This computation assumes that all executive officers and directors are affiliates of the registrant. Such assumption should not be deemed conclusive for any other purpose.

As of March 11, 2020, 50,385,341 shares of common stock were issued and outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

In accordance with General Instruction G(3) to Form 10-K, portions of the registrant's Definitive Proxy Statement on Schedule 14A for its Annual Meeting of Stockholders to be filed with the Commission within 120 days after the close of the fiscal year covered by this Annual Report on Form 10-K are incorporated by reference into Part III of this Annual Report on Form 10-K. Only those portions of the proxy statement that are specifically incorporated by reference herein shall constitute a part of this Annual Report on Form 10-K.

Recent U.S. tax legislation may adversely affect our financial condition, results of operations and cash flows, including the ability to use net operating losses and certain other tax attributes.

Our ability to use our federal and state net operating losses to offset potential future taxable income and related income taxes that would otherwise be due is dependent upon our generation of future taxable income before the expiration dates of the net operating losses, and we cannot predict with certainty when, or whether, we will generate sufficient taxable income to use all or any portion of our net operating losses. In addition, utilization of net operating losses to offset potential future taxable income and related income taxes that would otherwise be due is subject to annual limitations under the “ownership change” provisions of Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, or the Code, and similar state provisions, which may result in the expiration of net operating losses before future utilization. In general, under the Code, if a corporation undergoes an “ownership change,” generally defined as a greater than 50% change (by value) in its equity ownership over a three-year period, the corporation’s ability to use its pre-change net operating losses and other pre-change tax attributes (such as research and development credit carryforwards) to offset its post-change taxable income or taxes may be limited. Changes in our stock ownership, some of which may be outside of our control, could in the future result in an ownership change. Although we have adopted a Tax Benefits Preservation Plan and a provision in our certificate of incorporation, each of which are designed to discourage investors from acquiring ownership of our common stock in a manner that could trigger an ownership change, and we have completed studies to provide reasonable assurance that an ownership change limitation would not apply, we cannot be certain that a taxing authority would reach the same conclusion. If, after a review or audit, an ownership change limitation were to apply, utilization of our domestic net operating losses and tax credit carryforwards could be limited in future periods and a portion of the carryforwards could expire before being available to reduce future income tax liabilities.

If we encounter unforeseen difficulties with our business or operations in the future that require us to obtain additional working capital, and we cannot obtain additional working capital on favorable terms, or at all, our business may suffer.

Our consolidated cash and cash equivalents and trading securities totaled \$168.3 million and \$165.5 million at December 31, 2019 and 2018, respectively. To date, we have relied primarily upon net cash flows from our operations and from the public and private sale of equity securities to generate the working capital needed to finance our operations. We may encounter unforeseen difficulties with our business or operations in the future that may deplete our capital resources more rapidly than anticipated. As a result, we may be required to obtain additional working capital in the future through bank credit facilities, public or private debt or equity financings, or otherwise. If we are required to raise additional working capital in the future, such financing may be unavailable to us on favorable terms, if at all, or may be dilutive to our existing stockholders. If we fail to obtain additional working capital, as and when needed, such failure could have a material adverse impact on our business, results of operations and financial condition.

Failure to effectively manage our operational changes could strain our managerial, operational and financial resources and could adversely affect our business and operating results.

Operational changes primarily relate to changes in our board of directors and senior management. During 2018, we announced various changes to our board of directors and senior management, including a reconstituted board of directors and the terminations of our President, our Chief Financial Officer, Senior Vice President of Finance and Treasurer and our Executive Vice President, General Counsel and Secretary. We also announced in 2018 the appointment of our new Chief Intellectual Property Officer Marc W. Booth. In 2019 we appointed Clifford Press as our new Chief Executive Officer, and Alfred V. Tobia, Jr. as our new President and Chief Investment Officer. Changes in leadership and key management positions have inherent risks, and there are no assurances that any of our recent changes will not affect our financial condition.

If we fail to manage our operational changes effectively or to develop, expand or otherwise modify our managerial, operational and financial resources and systems, our business and financial results will be materially harmed.

Patent portfolio investments may present risks, and we may be unable to achieve the financial or other goals intended at the time of any potential investment.

Our licensing and enforcement business has depended, in part, on our ability to invest in patented technologies, patent portfolios, or companies holding such patented technologies and patent portfolios. Accordingly, historically we have engaged in patent portfolio investments in an effort to expand our patent portfolio assets. Such investments and potential investments are subject to numerous risks, including the following:

- our inability to enter into a definitive agreement with respect to any potential patent portfolio investment, or if we are able to enter into such agreement, our inability to consummate the potential investment transaction;

EXHIBIT 21

Acacia Research



Patent Licensing

Overview

Acacia Research Group, a subsidiary of Acacia Research Corporation, is an industry leader in patent licensing. By partnering with patent owners, Acacia applies its deep legal and technology expertise to patent assets to unlock financial value. An intermediary in the patent market, Acacia facilitates efficiency and delivers monetary rewards to the patent owner.

Our History

Acacia was founded in 1993 by Bruce Stewart. Mr. Stewart, with strong ties to the California Institute of Technology, was a serial inventor and entrepreneur who valued innovation. Mr. Stewart's vision for Acacia combined investment capital, ideas and bright people, allowing their emerging inventions to flourish.

On the heels of the financial market and NASDAQ meltdown in 2000, Acacia refocused its corporate strategy concentrating exclusively on technology backed by strong patents. Under the leadership of Paul Ryan and Chip Harris, the architects of Acacia's new strategic vision, and after successfully licensing its own technologies, Acacia sought to build an independent patent licensing business, mimicking the in-house efforts of successful patent licensing companies like IBM and Qualcomm.

From that origin, Acacia and our patent partners have signed more than 1200 licensing agreements with many of the world's largest companies. Consistent with its innovation heritage, Acacia has returned more than \$727,000,000 to our patent partners. The Acacia team is un-paralleled in its ability to identify, secure, analyze and monetize intellectual property in a rapidly developing secondary market for patent assets.

How We Work

Our Philosophy - *We believe in invention.*

Acacia believes inventors and their patented inventions are the building blocks of the U.S. economy. Robust, innovative patents are an essential part of economic growth and job creation. They continuously enhance our quality of life. Strong patents and strong patent protection also represent our country's key competitive advantage in the global marketplace. We believe inventors and patent owners should be empowered and fairly rewarded for the genius of their inventions, incentivizing and driving renewed innovation. We work towards this end, providing inventors and organizations with opportunities to unleash the untapped potential in patents.

Our Process - *We fuel innovation.*

Patents are a complex and technical subject. At Acacia, we merge our deep legal and technology expertise to continually uncover robust patent assets and bring needed proficiency to patent licensing. Our professionals actively seek to identify high-quality but undervalued patent portfolios in a variety of industries. Acacia is an intermediary in the patent marketplace partnering with patent

owners to unlock the financial value in their patented inventions. Our partnership with patent owners is the cornerstone of our corporate strategy. We assume all responsibility for operational expenses and share net licensing revenue with our patent partners on a pre-arranged and negotiated basis. We also provide capital to the patent owner as an advance against future licensing revenue. Acacia bridges the gap between invention and application, facilitating efficiency and delivering monetary rewards to the patent owner.

Who We Serve - *Rewarding the idea makers and the world changers.*

Acacia Research partners with disenfranchised patent owners, including individual inventors, universities, and large multi-national corporations in the technology, medical and industrial industries. A disenfranchised patent owner is technology and patent rich but capital poor, having never received fair compensation for the unauthorized use of its patented inventions. Acacia strives to reward patent owners for their creative genius. Because of legislative and regulatory changes, patent licensing has become increasingly difficult and expensive for patent owners, resulting in a significant number of high-quality but financially under-performing patent assets. This necessitates an experienced, deep-pocketed licensing partner. Acacia focuses solely on the patent market, and has emerged as the leading independent patent licensing company in the secondary market.

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EXHIBIT 23



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Marc Booth



Marc Booth

Chief IP Officer at Acacia Research

Newport Beach, California · 500+ connections

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Acacia Research



USC

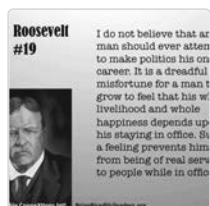
About

Executive with over 10 years experience in patent monetization and over 25 years in design and development engineering.

Specialties:

- * Triaging and Analyzing Large Patent Portfolios
- * Determining Real-World Valuations
- * Performing Rapid and Thorough Due Diligence for Patent Acquisitions

Activity



..
Liked by Marc Booth

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Experience



Chief IP Officer

Acacia Research

Aug 2018 - Present · 2 years 8 months

Newport Beach, CA

Tasked by Acacia's new Board of Directors with managing and growing Acacia's patent licensing business. Responsible for all aspects of the business, including portfolio analysis, acquisition and licensing.



CEO

Booth IP

Jun 2017 - Aug 2018 · 1 year 3 months

Newport Beach, CA

Offering Patent Portfolio Analysis and Valuation Services as well as Licensing Support.



Executive Vice President & General Manager, Engineering

Acacia Research

Jun 2006 - Jun 2017 · 11 years 1 month

Newport Beach, CA

Assist in managing overall Company operations. Lead the Engineering Group, which is responsible for technical analysis of patent portfolios and support for business development and licensing activities. Technology sectors include communications,



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Marc Booth


Jun 2005 - Jun 2006 · 1 year 1 month

Responsible for development of high-end residential networked entertainment and control systems. Developed robust, standards-based open architecture solutions to replace existing proprietary AMX and Crestron systems. Worked across functional boundaries to support technical needs of other Company organizations involved in venture capital investments, philanthropic and IT infrastructure activities.

**VP Engineering**

Intheairnet, LLC

Jul 2003 - Jun 2005 · 2 years

Conceptualized and managed the development of new hardware and software products for the In-Flight Entertainment market

**Sr. Director, Engineering**

Powerwave Technologies

2002 - 2003 · 1 year

Managed Digital Design and Program Management Departments. Responsibilities included all digital hardware and software design for embedded control applications of the base station amplifiers, as well as the overall program management responsibilities for all the Powerwave development projects.

**VP Engineering**

Comarco Wireless Technologies

1999 - 2002 · 3 years

Managed Engineering Department of 40 employees with \$6M annual budget. Designed test and measurement equipment for cellular network analysis, optimization and competitive benchmarking. Products consisted of RF scanners, DSP's, real-time data acquisition firmware and MS Windows data logging and display applications. Technologies included GSM/GPRS, cdma2000 and WCDMA.

**VP Engineering/Director Engineering**

Sony

1991 - 1999 · 8 years



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Marc Booth

units as well as all client software for user interface, transaction processing and...

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Section Head

Hughes Aircraft Company

1979 - 1991 · 12 years

Managed an organization of over 30 electrical, software and test design engineers in development of several display products. Led a multi-disciplinary Integrated Product Development Team of over 50 people in developing a new high performance graphics workstation. Responsible for all aspects of electrical, mechanical, software and test design, production implementation, and quality.

Education

USC

MS · EE

1979 - 1981

UC Riverside

BS · Physics

1975 - 1979

Groups

OCTANe

-

Executive Suite

-

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" Marc is an excellent leader and technologist. I've have worked with Marc for over 4 years currently at IntheAirNet and Comarco Wireless Technologies and through out all the challenges that go along with product development, we always developed superior products and had fun.

" Marc is an excellent leader and technologist. I've have worked with Marc for over 4 years currently at IntheAirNet and Comarco Wireless Technologies and through out all the challenges that go along with product development, we always developed superior products and had fun.

1 person has recommended Marc

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Shawn Ambwani

Chief Patent Troll and Counterfeit Killer - World's most followed patent professional
San Francisco Bay Area



Erik Ahroon



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Marc Booth

New York, NY

**Nadereh Russell**

Vice President at Acacia Research

Orange County, CA

**Michael Doyle**

Vice President, Chief Intellectual Property Counsel at NuVasive

San Diego County, CA

**Brett Alten**

Senior Vice President and Deputy General Counsel at Hewlett Packard Enterprise

Los Altos, CA

**Holly Hernandez**

Senior Vice President, Licensing at Acacia Research Group, LLC

Frisco, TX

**Robert Wawrzyn**

Chief IP Counsel, GE Healthcare

Greater Milwaukee

**Robert Heath**

Technology and Intellectual Property Executive

San Francisco, CA

**Kent Richardson**

CEO Richardson Oliver Insights. Partner ROL Group. Expert witness. Former SVP, General Counsel, and VP IP.

San Francisco Bay Area

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**Marc Booth**

Operations Director

Watford

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Toronto, ON

**Marc Booth**Senior Change / IT Project Manager
Greater Preston Area

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**Marc Booth**

Chief IP Officer at Acacia Research



Chief IP Officer at Acacia Research



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EXHIBIT 24



Eric Lucas

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Eric Lucas

Senior Vice President, Licensing and Litigation at Acacia Research Group
Laguna Beach, California · 245 connections

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Acacia Research Group



Indiana University Bloomington

Activity

I am so excited to announce that I have joined Steelike, Inc. as CEO to help lead the Company in next phase of its journey! Co-founder William...

Liked by Eric Lucas

DID YOU KNOW? Corvaglia USA uses various third-party companies to purchase our post-industrial HDPE material because it is essentially 'virgin' grade...



Q Eric Lucas

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Senior Vice President, Licensing and Litigation

Acacia Research Group

2012 - Present · 9 years

Newport Beach, CA

Licensing Agent

Intellectual Ventures

2011 - 2012 · 1 year

Laguna Beach, CA



Director of Licensing

Open Invention Network

2010 - 2012 · 2 years

Laguna Beach



Attorney

Independent Intellectual Property Attorney

2008 - 2012 · 4 years

Laguna Beach, CA

Director of Licensing for Open Invention Network ("OIN"); Director of Licensing for EpicenterIP (formerly IPotential); Licensing Agent for Intellectual Ventures



Q Eric Lucas

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Director, Intellectual Property Business

Boeing

2003 - 2004 · 1 year

Irvine, CA

Senior VP, General Counsel and Director of IP

Cambridge Display Technology

2001 - 2003 · 2 years

Cambridge, United Kingdom

Education

Indiana University Bloomington

JD · Law

Rose-Hulman Institute of Technology

BS · Engineering

Groups



Eric Lucas

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Lucas Keller

Director of Facilities and Properties at Port Clinton City Schools
Ohio, United States



Enno D. Bibow

Vice President, Licensing & Business Development
France



Thomas Smith

Projects Director at FS&D
Alpharetta, GA



William Martini

Director Of Engineering



Q Eric Lucas

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Bob de Jong
GZ-psycholoog i.o.t. Psychotherapeut bij GGZ Momentum
Hilvarenbeek



Kate LaPoint
Sr. Manager, Business Operations & Communications at T-Mobile
Greater Seattle Area



Nadereh Russell
Vice President at Acacia Research
Orange County, CA



Saerom Yu
Research assistant at Korea Institute of Science and Technology
College Station, TX



Jason W. Short, P.E.
Managing Member at MSA Holdings, LLC
Vero Beach, FL

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Others named **Eric Lucas**



Eric Lucas
Directeur Plug & Sorb
Greater Paris Metropolitan Region



Q Eric Lucas

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Founder/Executive Chairman at Spring Holdings Co., Ltd. Investor
Japan

Eric Lucas

Millwright at ArcelorMittal Dofasco
Hamilton, ON

Eric Lucas

Administrateur délégué chez Westore sprl et Lucas sa
Overijse

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Understanding Trademarks: A Deeper Dive





Q Eric Lucas

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Eric Lucas

Senior Vice President, Licensing and Litigation at Acacia Research Group

Senior Vice President, Licensing and Litigation at Acacia Research Group

Indiana University Bloomington

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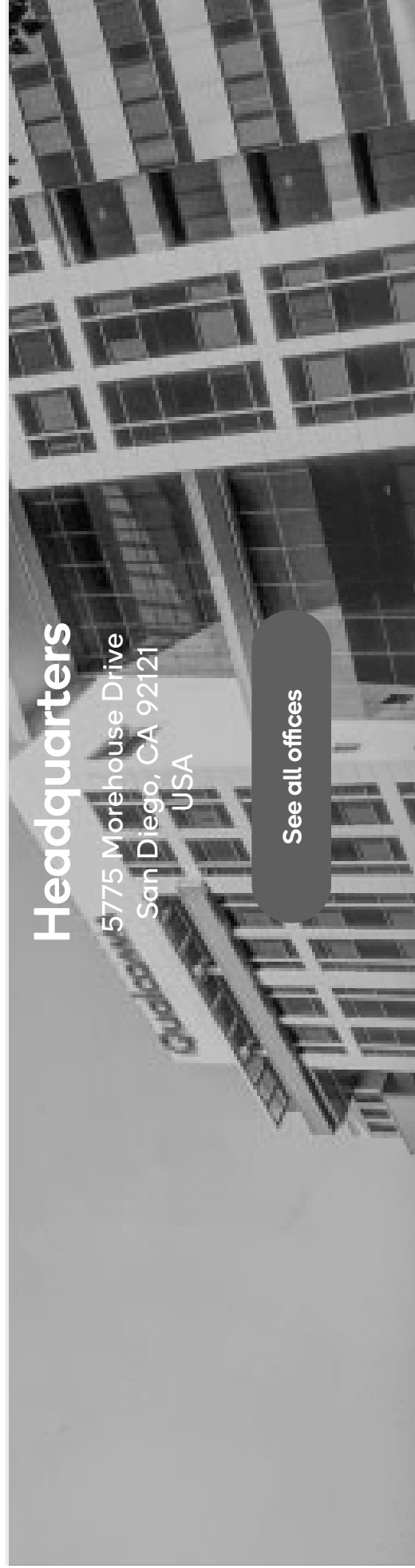


 Eric Lucas

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EXHIBIT 25



Options for contacting Qualcomm

We have several options for contacting us, depending on your need. Please review the options below and make your selection.

Sales

Are you interested in becoming a partner or conducting business with Qualcomm? If so, this option is for you.



Use this form if you are interested in seeking licensing from Qualcomm or have an inquiry surrounding patents or copyrights.

Technical Support

Explore Qualcomm support options for your Qualcomm ID, content access, product support, and getting resources you need to help you build your next innovation. Please note, we are unable to provide support for OEM devices.

Corporate Functions

Have a question for one of our communications departments such as public relations, analyst relations, or investor relations? Start here.

Distributors & Providers

Explore a list of preferred providers, distributors, and design centers.



Logo Request

Looking for Information and guidelines for proper and consistent use of the Qualcomm brand? Click here to get started.

Website Feedback

Please use website feedback for any technical issues you're experiencing with Qualcomm.com. Use this option to report broken links, typos, missing information or other general feedback specific to the website.

Careers Website Feedback

Please contact the Qualcomm Careers team for any technical issues you're experiencing with the Qualcomm jobs portal such as importing resumes or creating a profile.

Business Conduct Hotline

We respond to reports of misconduct as quickly and as confidentially as possible. To raise concerns, contact our Business

Human Resources Hub

Please visit our public HR Hub portal at this link to browse our HR knowledge center which contains basic information about our HR and Benefits programs in the United States.



 Language

>

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References to "Qualcomm" may mean Qualcomm Incorporated, or subsidiaries or business units within the Qualcomm corporate structure, as applicable.



Nothing in these materials is an offer to sell any of the components or devices referenced herein.

EXHIBIT 26

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549**

FORM 10-K

(Mark one)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended September 27, 2020

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from _____ to _____ .

Commission File Number 0-19528

QUALCOMM Incorporated

(Exact name of registrant as specified in its charter)

Delaware

**(State or Other Jurisdiction of Incorporation
or Organization)**

95-3685934

**(I.R.S. Employer
Identification No.)**

5775 Morehouse Dr., San Diego, California

(Address of Principal Executive Offices)

92121-1714

(Zip Code)

(858) 587-1121

(Registrant's telephone number, including area code)

Securities registered pursuant to section 12(b) of the Act:

<u>Title of Each Class</u>	<u>Trading Symbol(s)</u>	<u>Name of Each Exchange on Which Registered</u>
Common stock, \$0.0001 par value	QCOM	NASDAQ Stock Market

Securities registered pursuant to Section 12(g) of the Act:

None

EXHIBIT 28

Contact

www.linkedin.com/in/gyudong-kim-432b9631 (LinkedIn)

Top Skills

ASIC

IC

Semiconductors

Gyudong Kim

Engineer at Analog Devices
San Francisco Bay Area

Summary

Analog Designer & Architect, making a better world by one chip at a time.

Frequently haunts around HDMI/MHL/VESA standard activities.

Experience

Silicon Image

Engineer

August 1996 - Present (24 years 8 months)

Santa Clara, California, United States

DVI, HDCP, HDMI, MHL

Silicon Image got acquired by Lattice Semi in 2015. HDMI team is acquired by Invecas in 2017, and then acquired by Analog Devices in 2020.

ETRI

visiting researcher

December 1995 - August 1996 (9 months)

Daejeon, Korea

CDMA ASIC, TIA with HBT

University of Adelaide

visiting scholar

September 1993 - October 1994 (1 year 2 months)

Adelaide, South Australia

Bug-Eye project

Education

Seoul National University

Ph.D., Engineering · (1991 - 1996)

Seoul National University

MS, Electronics · (1989 - 1991)

Seoul National University

BS, Electronics · (1985 - 1989)

EXHIBIT 30

Contact

www.linkedin.com/in/min-kyu-kim-3100164 (LinkedIn)

Top Skills

PLL
ASIC
Signal Integrity

Languages

Korean

Min-Kyu Kim

Analog Design Eng Manager at Analog Devices
San Jose

Summary

High-speed Serdes, Interface IP, HDMI Tx & Rx, Video interface, analog design

Experience

Analog Devices
Analog Design Eng Manager
August 2020 - Present (8 months)

Invecas
Director
October 2017 - July 2020 (2 years 10 months)

Lattice Semiconductor
Director
March 2015 - September 2017 (2 years 7 months)

Silicon Image, Inc.
17 years 1 month
Director
July 2011 - March 2015 (3 years 9 months)

Design Manager
June 2004 - June 2011 (7 years 1 month)

Member of Technical Staff
December 1998 - June 2004 (5 years 7 months)

Consultant
March 1998 - November 1998 (9 months)
Working as a consultant while waiting for H-1B visa

ETRI
part-time researcher

December 1995 - June 1996 (7 months)

Education

Seoul National University

PhD, Engineering · (1990 - 1998)

Seoul National University

MS, Engineering · (1988 - 1990)

Seoul National University

Bachelor, Engineering · (1984 - 1988)

EXHIBIT 31

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS

)
SUPER INTERCONNECT)
TECHNOLOGIES LLC,)
)
Plaintiff,)
)
vs.) No. 2:18-CV-00462-JRG
)
HUAWEI DEVICE CO. LTD.,)
et al.,)
)
Defendants.)

VIDEOTAPED DEPOSITION OF MIN-KYU KIM, Ph.D.
Menlo Park, California
Tuesday, September 10, 2019
Volume I

Reported by:
CATHERINE A. RYAN, RMR, CRR
CSR No. 8239
Job No. 3513459

PAGES 1 - 122

EXHIBIT 32

**UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

SUPER INTERCONNECT TECHNOLOGIES
LLC,

Plaintiff,

v.

HUAWEI DEVICE CO. LTD., et al.,

Defendants.

Case No.: 2:18-cv-00462-JRG
(LEAD CASE)

GOOGLE LLC,

Defendant.

Case No.: 2:18-cv-00463-JRG

DECLARATION OF JAIME GARCIA

I, Jaime Garcia, declare as follows:

1. I am a Contract Manager at Lattice Semiconductor Corporation ("Lattice"). I have worked in this role at Lattice since 2015.

2. Prior to working at Lattice, I was a Contract Manager at Silicon Image Inc. ("Silicon Image"). I worked at Silicon Image from 2006 to 2015. When Lattice acquired Silicon Image in 2015, I started working at Lattice.

3. I have reviewed the documents produced by Lattice in response to a subpoena served by Google in this litigation.

4. I have reviewed the documents labeled Latt-SIT-000434, Latt-SIT-000439-Latt-SIT-000441, and Latt-SIT-000294-Latt-SIT-000300.

5. It is my understanding that these documents have been maintained by Lattice in the ordinary course of its business.

1 6. I have reviewed the documents labeled Latt-SIT-000207-Latt-SIT-000209, Latt-SIT-
2 000171-Latt-SIT-000174, and Latt-SIT-000301-Latt-SIT-000302.

3 7. I am informed and believe that these documents were prepared by or received by Lattice
4 employees at or near the time they are dated. I also understand that these documents were prepared by
5 or received by Lattice employees acting within the scope of their normal job responsibilities as Lattice
6 employees. It is my understanding that Lattice has maintained these documents in the ordinary course
7 of its business.

8 8. I have reviewed the document labeled Latt-SIT-000219-Latt-SIT-000240.

9 9. I am informed and believe that Lattice obtained this document as part of Lattice's 2015
10 acquisition of Silicon Image. It is my understanding that, from approximately that time until now,
11 Lattice has maintained this document in the ordinary course of its business.

12 10. It is also my understanding that, prior to Lattice's acquisition of Silicon Image, Silicon
13 Image maintained this document in the ordinary course of its business.

14 11. I have reviewed the documents labeled Latt-SIT-000210-Latt-SIT-000218, Latt-SIT-
15 000052-Latt-SIT-000056, Latt-SIT-000087-Latt-SIT-000102, Latt-SIT-000103-Latt-SIT-000152, Latt-
16 SIT-000153-Latt-SIT-000170, Latt-SIT-000175-Latt-SIT-000200, Latt-SIT-000201, Latt-SIT-000202-
17 Latt-SIT-000206, Latt-SIT-000435, Latt-SIT-000442-Latt-SIT-000463, Latt-SIT-000464-Latt-SIT-
18 000471, Latt-SIT-000472-Latt-SIT-000479, Latt-SIT-000517-Latt-SIT-000524, Latt-SIT-000518-Latt-
19 SIT-000542, Latt-SIT-000550-Latt-SIT-000561, Latt-SIT-000562-Latt-SIT-000572, and Latt-SIT-
20 000573-Latt-SIT-000580.

21 12. I am informed and believe that Lattice obtained these documents as part of Lattice's 2015
22 acquisition of Silicon Image. It is my understanding that, from approximately that time until now,
23 Lattice has maintained these documents in the ordinary course of its business.

24 13. It is also my understanding that, prior to Lattice's acquisition of Silicon Image, Silicon
25 Image maintained these documents in the ordinary course of its business.

26 14. I have reviewed the documents labeled Latt-SIT-000007-Latt-SIT-000017, Latt-SIT-
27 000018-Latt-SIT-000026, Latt-SIT-000027-Latt-SIT-000037, Latt-SIT-000038-Latt-SIT-000048, Latt-
28 SIT-000049, Latt-SIT-000241, and Lat-SIT-000639-Lat-SIT-000651.

1 15. I am informed and believe that Lattice obtained these documents as part of Lattice's 2015
2 acquisition of Silicon Image. It is my understanding that, from approximately that time until now,
3 Lattice has maintained these documents in the ordinary course of its business.

4 16. It is also my understanding that, prior to Lattice's acquisition of Silicon Image, Silicon
5 Image maintained these documents in the ordinary course of its business.

6 17. I have reviewed the documents labeled Latt-SIT-000327-Latt-SIT-000328, Latt-SIT-
7 000581-Latt-SIT-000583, Latt-SIT-000001-Latt-SIT-000006, Latt-SIT-000051, and Lat-SIT-000584.

8 18. I am informed and believe that Lattice obtained these documents as part of Lattice's 2015
9 acquisition of Silicon Image. It is my understanding that, from approximately that time until now,
10 Lattice has maintained these documents in the ordinary course of its business.

11 19. I have reviewed the documents labeled Latt-SIT-000273-Latt-SIT-000293, Latt-SIT-
12 000303-Latt-SIT-000323, Latt-SIT-000362-Latt-SIT-000382, Latt-SIT-000383-Latt-SIT-000404, Latt-
13 SIT-000405-Latt-SIT-000433, Lat-SIT-000587-Lat-SIT-000607, Lat-SIT-000608-Lat-SIT-000636, and
14 Latt-SIT-000329-Latt-SIT-000361.

15 20. I am informed and believe that Lattice obtained these documents as part of Lattice's 2015
16 acquisition of Silicon Image. It is my understanding that, from approximately that time until now,
17 Lattice has maintained these documents in the ordinary course of its business.

18 21. I have reviewed the documents labeled Latt-SIT-000324-Latt-SIT-000326, Lat-SIT-
19 000585, Lat-SIT-000586, and Lat-SIT-000637-Lat-SIT-000638.

20 22. I am informed and believe that Lattice obtained these documents as part of Lattice's 2015
21 acquisition of Silicon Image. It is my understanding that, from approximately that time until now,
22 Lattice has maintained these documents in the ordinary course of its business.

23 23. I have reviewed the documents labeled Latt-SIT-000242-Latt-SIT-000245, Latt-SIT-
24 000246-Latt-SIT-000268, Latt-SIT-000269, Latt-SIT-000270-Latt-SIT-000271, Latt-SIT-000272, Latt-
25 SIT-000437-Latt-SIT-000438, and Latt-SIT-000484-Latt-SIT-000506.

26 24. I am informed and believe that Lattice obtained these documents as part of Lattice's 2015
27 acquisition of Silicon Image. It is my understanding that, from approximately that time until now,
28 Lattice has maintained these documents in the ordinary course of its business.

1
2 I declare under the penalty of perjury under the laws of the United States of America that the
3 foregoing is true and correct.
4

5 Executed on October 31, 2019 in San Jose, California.
6

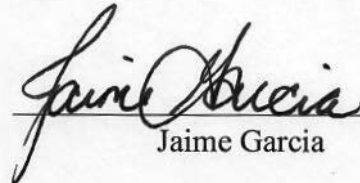
7 
8 Jaime Garcia
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EXHIBIT 33



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About Us

Lattice Semiconductor (NASDAQ: LSCC) is the low power programmable leader. We solve customer problems across the network, from the Edge to the Cloud, in the growth areas of communications, computing, industrial, automotive and consumer markets. Our technology, long-standing relationships, and commitment to world-class support lets our customers quickly and easily unleash their innovation to create a smart, secure and connected world.

Follow us on LinkedIn, Twitter, Facebook, YouTube, or RSS.

- Corporate Management
- Corporate Social Responsibility

Locations

Oregon - Corporate Headquarters



The Portland metro area, the "City of Roses", is home to over 1.9 million people and is one of the fastest growing cities in the United States. It is located just an hour from the beautiful Oregon coast and picturesque Cascade ski resorts.

5555 NE Moore Ct, Hillsboro, OR 97124 [Map](#)

Tel: (503) 268-8000

Fax: (503) 268-8169

Shanghai - Development Center



Serving as the largest base of Chinese industrial technology, the important seaport and China's largest commercial financial center, Shanghai draws the attention of the world.

Building 17, No. 1036 Tianlin Road Minhang District, Shanghai, 200233 China

Tel: +86 21 61265126

Fax: +86 21 52989890

Manila - Operations Center



With its protected harbor, Manila serves as the main seaport of the Philippines, as the Port of Manila is one of the busiest in the world. Diverse manufacturers produce a wide variety of products such as electronic goods, textiles, and clothing.

11/F Aeon Centre

Lot 2-3 Blk 45 Filinvest Ctr.

Alabang Zapote Road cor. Northbridgeway

Muntinlupa City 1780 Philippines

Tel: +63 2 77176600

Silicon Valley - Development Center



Known as the "Capital of Silicon Valley", San Jose is a historic and high-tech city. San Jose offers many interesting activities; world-class cultural arts, professional sports, theme parks, wineries, parks and gardens.

2115 O'Neil Drive, San Jose, CA 95131 [Map](#)

Tel: (408) 826-6000

Fax: (408) 826-6034

Singapore - Operations Center



Singapore has the full value chain of semiconductor activities including 40 integrated circuit design houses, 14 silicon wafer fabrication plants and 20 outsourced assembly and test facilities.

Lattice SG Pte. Ltd.
101 Thomson Road, United Square #07-02, Singapore 307591
Tel: 011-65-6631-2000
Fax: 011-65-6481-4377

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EXHIBIT 34

UNITED STATES DISTRICT COURT

for the

Eastern District of Texas

Super Interconnect Technologies LLC

Plaintiff

v.

Huawei Device Co. Ltd. et al

Defendant

Civil Action No. 2:18-CV-00462-JRG

SUBPOENA TO TESTIFY AT A DEPOSITION IN A CIVIL ACTION

To:

Lattice Semiconductor Corporation

(c/o Corporation Service Co., 1127 Broadway St., Suite 310, Salem, OR 87301)

(Name of person to whom this subpoena is directed)

☒ **Testimony:** **YOU ARE COMMANDED** to appear at the time, date, and place set forth below to testify at a deposition to be taken in this civil action. If you are an organization, you must designate one or more officers, directors, or managing agents, or designate other persons who consent to testify on your behalf about the following matters, or those set forth in an attachment:

See Attachment A

Place: LNS Court Reporting c/o Veritext 520 SW Yamhill Street Suite 444 Portland, OR 97204	Date and Time: 08/12/2019 9:00 am
--	--------------------------------------

The deposition will be recorded by this method: _____

- ☐ **Production:** You, or your representatives, must also bring with you to the deposition the following documents, electronically stored information, or objects, and must permit inspection, copying, testing, or sampling of the material:

The following provisions of Fed. R. Civ. P. 45 are attached – Rule 45(c), relating to the place of compliance; Rule 45(d), relating to your protection as a person subject to a subpoena; and Rule 45(e) and (g), relating to your duty to respond to this subpoena and the potential consequences of not doing so.

Date: 06/28/2019

CLERK OF COURT

OR

/s/ Mark Liang

Signature of Clerk or Deputy Clerk_____
Attorney's signature

The name, address, e-mail address, and telephone number of the attorney representing (name of party) Google LLC

, who issues or requests this subpoena, are:
Mark Liang, Two Embarcadero Center, San Francisco, CA 94111; mliang@omm.com; (415) 984-8700

Notice to the person who issues or requests this subpoena

If this subpoena commands the production of documents, electronically stored information, or tangible things before trial, a notice and a copy of the subpoena must be served on each party in this case before it is served on the person to whom it is directed. Fed. R. Civ. P. 45(a)(4).

Civil Action No. 2:18-CV-00462-JRG

PROOF OF SERVICE

(This section should not be filed with the court unless required by Fed. R. Civ. P. 45.)

I received this subpoena for *(name of individual and title, if any)* _____
on *(date)* _____.

☐ I served the subpoena by delivering a copy to the named individual as follows: _____

_____ on *(date)* _____; or

☐ I returned the subpoena unexecuted because: _____
_____.

Unless the subpoena was issued on behalf of the United States, or one of its officers or agents, I have also
tendered to the witness the fees for one day's attendance, and the mileage allowed by law, in the amount of
\$ _____.

My fees are \$ _____ for travel and \$ _____ for services, for a total of \$ 0.00 .

I declare under penalty of perjury that this information is true.

Date: _____

Server's signature

Printed name and title

Server's address

Additional information regarding attempted service, etc.:

Federal Rule of Civil Procedure 45 (c), (d), (e), and (g) (Effective 12/1/13)**(c) Place of Compliance.**

(1) For a Trial, Hearing, or Deposition. A subpoena may command a person to attend a trial, hearing, or deposition only as follows:

- (A) within 100 miles of where the person resides, is employed, or regularly transacts business in person; or
- (B) within the state where the person resides, is employed, or regularly transacts business in person, if the person
 - (i) is a party or a party's officer; or
 - (ii) is commanded to attend a trial and would not incur substantial expense.

(2) For Other Discovery. A subpoena may command:

- (A) production of documents, electronically stored information, or tangible things at a place within 100 miles of where the person resides, is employed, or regularly transacts business in person; and
- (B) inspection of premises at the premises to be inspected.

(d) Protecting a Person Subject to a Subpoena; Enforcement.

(1) Avoiding Undue Burden or Expense; Sanctions. A party or attorney responsible for issuing and serving a subpoena must take reasonable steps to avoid imposing undue burden or expense on a person subject to the subpoena. The court for the district where compliance is required must enforce this duty and impose an appropriate sanction—which may include lost earnings and reasonable attorney's fees—on a party or attorney who fails to comply.

(2) Command to Produce Materials or Permit Inspection.

(A) *Appearance Not Required.* A person commanded to produce documents, electronically stored information, or tangible things, or to permit the inspection of premises, need not appear in person at the place of production or inspection unless also commanded to appear for a deposition, hearing, or trial.

(B) *Objections.* A person commanded to produce documents or tangible things or to permit inspection may serve on the party or attorney designated in the subpoena a written objection to inspecting, copying, testing, or sampling any or all of the materials or to inspecting the premises—or to producing electronically stored information in the form or forms requested. The objection must be served before the earlier of the time specified for compliance or 14 days after the subpoena is served. If an objection is made, the following rules apply:

- (i) At any time, on notice to the commanded person, the serving party may move the court for the district where compliance is required for an order compelling production or inspection.
- (ii) These acts may be required only as directed in the order, and the order must protect a person who is neither a party nor a party's officer from significant expense resulting from compliance.

(3) Quashing or Modifying a Subpoena.

(A) *When Required.* On timely motion, the court for the district where compliance is required must quash or modify a subpoena that:

- (i) fails to allow a reasonable time to comply;
- (ii) requires a person to comply beyond the geographical limits specified in Rule 45(c);
- (iii) requires disclosure of privileged or other protected matter, if no exception or waiver applies; or
- (iv) subjects a person to undue burden.

(B) *When Permitted.* To protect a person subject to or affected by a subpoena, the court for the district where compliance is required may, on motion, quash or modify the subpoena if it requires:

(i) disclosing a trade secret or other confidential research, development, or commercial information; or

(ii) disclosing an unretained expert's opinion or information that does not describe specific occurrences in dispute and results from the expert's study that was not requested by a party.

(C) *Specifying Conditions as an Alternative.* In the circumstances described in Rule 45(d)(3)(B), the court may, instead of quashing or modifying a subpoena, order appearance or production under specified conditions if the serving party:

- (i) shows a substantial need for the testimony or material that cannot be otherwise met without undue hardship; and
- (ii) ensures that the subpoenaed person will be reasonably compensated.

(e) Duties in Responding to a Subpoena.

(1) Producing Documents or Electronically Stored Information. These procedures apply to producing documents or electronically stored information:

(A) *Documents.* A person responding to a subpoena to produce documents must produce them as they are kept in the ordinary course of business or must organize and label them to correspond to the categories in the demand.

(B) *Form for Producing Electronically Stored Information Not Specified.* If a subpoena does not specify a form for producing electronically stored information, the person responding must produce it in a form or forms in which it is ordinarily maintained or in a reasonably usable form or forms.

(C) *Electronically Stored Information Produced in Only One Form.* The person responding need not produce the same electronically stored information in more than one form.

(D) *Inaccessible Electronically Stored Information.* The person responding need not provide discovery of electronically stored information from sources that the person identifies as not reasonably accessible because of undue burden or cost. On motion to compel discovery or for a protective order, the person responding must show that the information is not reasonably accessible because of undue burden or cost. If that showing is made, the court may nonetheless order discovery from such sources if the requesting party shows good cause, considering the limitations of Rule 26(b)(2)(C). The court may specify conditions for the discovery.

(2) Claiming Privilege or Protection.

(A) *Information Withheld.* A person withholding subpoenaed information under a claim that it is privileged or subject to protection as trial-preparation material must:

- (i) expressly make the claim; and
- (ii) describe the nature of the withheld documents, communications, or tangible things in a manner that, without revealing information itself privileged or protected, will enable the parties to assess the claim.

(B) *Information Produced.* If information produced in response to a subpoena is subject to a claim of privilege or of protection as trial-preparation material, the person making the claim may notify any party that received the information of the claim and the basis for it. After being notified, a party must promptly return, sequester, or destroy the specified information and any copies it has; must not use or disclose the information until the claim is resolved; must take reasonable steps to retrieve the information if the party disclosed it before being notified; and may promptly present the information under seal to the court for the district where compliance is required for a determination of the claim. The person who produced the information must preserve the information until the claim is resolved.

(g) Contempt.

The court for the district where compliance is required—and also, after a motion is transferred, the issuing court—may hold in contempt a person who, having been served, fails without adequate excuse to obey the subpoena or an order related to it.

ATTACHMENT A

ATTACHMENT A

DEFINITIONS AND INSTRUCTIONS

Definitions:

1. “Lattice Semiconductor,” “You,” “Your,” or “witness” shall refer to Lattice Semiconductor Corporation, any predecessor or successor of Lattice Semiconductor Corporation (including Invecas and Silicon Image), and any past or present parent, division, subsidiary, affiliate, joint venture, associated organization, director, officer, agent, employee, consultant, staff member, associate, partner, or other representative of Lattice Semiconductor Corporation.

2. “Invecas” shall refer to Invecas, Inc., any predecessor or successor of Invecas, Inc. (including Lattice Semiconductor and Silicon Image), and any past or present parent, division, subsidiary, affiliate, joint venture, associated organization, director, officer, agent, employee, consultant, staff member, associate, partner, or other representative of Invecas, Inc.

3. As used herein, “Silicon Image” shall refer to Silicon Image, Inc., any predecessor or successor of Silicon Image, Inc. (including Invecas and Lattice Semiconductor), and any past or present parent, division, subsidiary, affiliate, joint venture, associated organization, director, officer, agent, employee, consultant, staff member, associate, partner, or other representative of Silicon Image, Inc.

4. As used herein, “Google” means Defendant Google LLC.

5. As used herein, “SIT” or “Plaintiff,” means Super Interconnect Technologies LLC and all of its predecessors (merged, acquired, or otherwise), successors, subsidiaries, parents (including Acacia Research Group LLC and Acacia Research Corporation), sisters, divisions, departments, and affiliates thereof, and all officers, directors, principals, agents, employees, attorneys, and other persons acting on its behalf.

6. As used herein, “BCPC” shall refer to the law firm of Bragalone Conroy PC, its predecessors, employees, and anyone acting on behalf of Bragalone Conroy PC.

7. As used herein, “’092 Patent” means U.S. Patent No. 6,463,092. A copy of the ’092 Patent is attached as Attachment C.

8. As used herein, “’593 Patent” means U.S. Patent No. 7,158,593. A copy of the ’593 Patent is attached as Attachment D.

9. As used herein, “’044 Patent” means U.S. Patent No. 7,627,044. A copy of the ’044 Patent is attached as Attachment E.

10. As used herein, “Asserted Patents” means each or all of the ’092, ’593, and ’044 Patents.

11. As used herein, “’092 Provisional” means U.S. Patent Provisional Application No. 60/099,770, to which the ’092 Patent claims priority. A copy of the ’092 Provisional is attached as Attachment F.

12. As used herein, “’593 Provisional” means U.S. Patent Provisional Application No. 60/276,672, to which the ’593 Patent claims priority. A copy of the ’593 Provisional is attached as Attachment G.

13. As used herein, the “Provisional Applications” means each or both of the ’092 and ’593 Provisionals.

14. “Inventors” shall mean any inventors named on the face of the Asserted Patents or Provisional Applications, including without limitation, Gyudong Kim, Min-Kyu Kim, Seung Ho Hwang, Ook Kim, Bruce Kim, Jaeha Kim, Won Jun Choe, Deong-Kyoon Jeong, and Bong-Joon Lee.

15. As used herein, “This Litigation” means the action captioned as *Super Interconnect Technologies LLC v. Google LLC, 2:18-cv-00463-JRG (E.D. Tex.)*.

16. As used herein, “Past Litigations” means any past legal proceeding (including federal court litigations, proceedings before the USPTO, and USITC investigations) involving one or more of the Asserted Patents or Provisional Applications. Past Litigations shall include, but are not limited to: (1) *Super Interconnect Technologies LLC v. Samsung Electronics Co., Ltd. et al., 2-15-cv-773 (E.D. Tex.)*; and (2) *Super Interconnect Technologies LLC v. HP Inc., 1:18-cv-01728-CFC (D. Del.)*.

17. As used herein, “Priority Date” shall mean the earliest date to which a patent or patent application claims priority, whether based on an earlier-filed parent patent application, foreign or international patent application, or provisional application, or based on prior conception or reduction to practice. Specifically, the Priority Date for each of the Asserted Patents is as follows:

- a. The Priority Date for the ’092 Patent is September 10, 1998.
- b. The Priority Date for the ’593 Patent is March 16, 2001.
- c. The Priority Date for the ’044 Patent is October 31, 2005.

18. As used herein, “Prior Art” includes any patent, patent application, printed publication, product, system, process, knowledge, use, sale or offer for sale, or other act or event defined in 35 U.S.C. §§ 102 and 103, taken alone or in combination with other art.

19. As used herein, “Accused Product(s)” means every apparatus, product, device, service, process, method, act, or other instrumentality that Plaintiff contends falls within the scope of any claim of any Asserted Patent, as identified in Plaintiff’s Infringement Contentions, and any amendments thereto, and/or any other assertion of infringement.

20. As used herein, “SIT-Silicon Image Assignment” refers to the Patent Assignment Agreement between Silicon Image Inc. and Acacia Research Group LLC regarding, in part, the Asserted Patents (attached as Attachment H), the First Amendment to this Agreement (attached as Attachment I), and the Second Amendment to this Agreement (attached as Attachment J).

21. As used herein, “Prior Assignee” means any entity (including its predecessors (merged, acquired, or otherwise), successors, subsidiaries, parents) who previously was assigned or held rights in any of the Asserted Patents or Provisional Applications. “Prior Assignee” includes but is not limited to the following entities: Invecas, Silicon Image, Jefferies Finance, Inc., Sibeam, Inc., and DVDO, Inc.

22. As used herein, “related” or “relating” to any given subject means, without limitation, identifying, describing, discussing, concerning, assessing, stating, reflecting,

constituting, containing, embodying, tending to support or refute, or referring directly or indirectly to, in any way, the particular subject matter identified.

23. As used herein, “identify” or “identifying” as applied to a document shall mean to specify: (a) the type of the document (i.e., whether it is a letter, memorandum, e-mail, etc.); (b) the document’s title and general subject matter; (c) the date the document was prepared, published, sent, served, or filed as appropriate; and (d) the name of each and every author, addressee, distributor, and recipient of the document.

24. As used herein, the term “identify” as applied to an event means to provide a description of the event and the date and location of the event.

25. As used herein, the term “identify” as applied to factual or legal bases means to state in detail each and every fact, and each and every legal proposition or interpretation, upon which a belief or contention is based.

26. As used herein, “communication” means any transmission of information by one or more persons and/or between two or more persons by any means, including telephone conversations, letters, telegrams, teletypes, telecopies, electronic mail, other computer linkups, written memoranda, and face to face conversations.

27. As used herein, “document” shall have the full meaning ascribed to it by the Federal Rules of Civil Procedure and further is used in a broad sense to refer to any electronic information or any tangible object or thing that contains, conveys, or records information, subject to the limitations of any agreements entered into between the parties as part of This Litigation, including the Discovery Order, and Protective Order.

28. As used herein, “person” means any natural person or any business, legal, or governmental entity.

29. As used herein, “and” and “or” shall be construed conjunctively and disjunctively so as to acquire the broadest meaning.

30. As used herein, “any” and “all” shall each be construed to mean “each and every,” so as to acquire the broadest meaning.

31. As used herein, the singular of any word shall include the plural, and the plural shall include the singular.

Instructions:

1. One or more representatives may be produced at deposition for one or more topics.
2. For Your convenience, a copy of the Protective Order issued in this action is attached hereto as Attachment B.
3. If in responding to these topics You claim any ambiguity in either a topic or a definition or instruction applicable thereto, identify in advance of the deposition the language You consider ambiguous and state the interpretation You are using in preparing Your witness(es) to testify.

TOPICS FOR DEPOSITION

Pursuant to Rule 45 and Rule 30(b)(6) of the Federal Rules of Civil Procedure, counsel for Google will take the deposition upon oral examination of Lattice Semiconductor on August 12, 2019, commencing at 9:00 a.m. at the offices of LNS Court Reporting c/o Veritext, 520 SW Yamhill Street, Suite 444, Portland, OR 97204, or at such other time and place as the parties may agree. The deposition will be taken before a notary public or other officer authorized to administer oaths and will be recorded by stenographic, audio and visual means. The stenographic recordation method may provide for the instant visual display of the testimony at deposition. One or more representatives from Lattice Semiconductor should be prepared to discuss the following topics:

DEPOSITION TOPIC NO. 1:

Publications, articles, presentations, conference papers, and dissertations that describe, refer to, or relate to the alleged inventions of the Asserted Patents or Provisional Applications.

DEPOSITION TOPIC NO. 2:

The development, conception, and reduction to practice (including any related diligence) of the alleged inventions of the Asserted Patents or Provisional Applications, including any notes, drawings, laboratory notebooks, or prototypes by any person involved in the development, conception, and reduction to practice (including any related diligence),

DEPOSITION TOPIC NO. 3:

The design, development, manufacturing, commercial implementation, sale, programming, prototyping, or testing of any of the alleged inventions disclosed in the Asserted Patents or Provisional Applications.

DEPOSITION TOPIC NO. 4:

Prior Art, including any patents, publications, products, or prototypes relating to the subject matter of the Asserted Patents or Provisional Applications and that predates the Priority Date of the Asserted Patents.

DEPOSITION TOPIC NO. 5:

The first disclosure, display, embodiment, use, or demonstration of any alleged invention disclosed or claimed in the Asserted Patents or Provisional Applications.

DEPOSITION TOPIC NO. 6:

Any business, investment, or valuation, including any business or investment plans, involving the Asserted Patents or any of the alleged inventions of the Asserted Patents, including any such business, investment, or valuation acquired from Silicon Image.

DEPOSITION TOPIC NO. 7:

Your ownership, interest, rights, or shares in the Asserted Patents, the outcome of any litigation concerning the Asserted Patents, any entity that holds or has held any ownership, interest, rights, or shares in the Asserted Patents, or SIT.

DEPOSITION TOPIC NO. 8:

Your involvement in any litigation or patent office proceeding relating to the Asserted Patents, including any Past Litigations.

DEPOSITION TOPIC NO. 9:

Any contract, agreement, license, or assignment relating to the Asserted Patents or any of the alleged inventions of the Asserted Patents, whether actual or contemplated, with or to any third party, including the Inventors and SIT.

DEPOSITION TOPIC NO. 10:

Lattice Semiconductor's employment of and relationships with any of the Inventors.

DEPOSITION TOPIC NO. 11:

Any obligation of Lattice Semiconductor or the Inventors to assist any successor-in-interest (including SIT) in prosecuting, licensing, or enforcing the Asserted Patents.

DEPOSITION TOPIC NO. 12:

The individuals involved in the development of the subject matter described or claimed in the Asserted Patents, whether or not an Inventor.

DEPOSITION TOPIC NO. 13:

Any communications with SIT (including Acacia Research Group LLC and Acacia Research Corporation) or BCPC regarding any of the Asserted Patents.

DEPOSITION TOPIC NO. 14:

Any communications with any Prior Assignee or any representative of any Prior Assignee, including but not limited to Proskauer Rose LLP, regarding any of the Asserted Patents.

DEPOSITION TOPIC NO. 15:

Any involvement by You related to JEDEC's UFS standards (including versions of JEDEC Standard No. JESD220) or MIPI Alliance, Inc's standards (including versions of the M-PHY standard).

DEPOSITION TOPIC NO. 16:

Any agreements relating to JEDEC or MIPI Alliance, Inc., including but not limited to membership agreements and intellectual property disclosures.

DEPOSITION TOPIC NO. 17:

Any documents produced by You in response to the Document Subpoena.

DEPOSITION TOPIC NO. 18:

Whether You have inherited the rights and obligations specified under the SIT-Silicon Image Assignment as a result of your acquisition of Silicon Image, and whether those rights and obligations are currently in effect.

DEPOSITION TOPIC NO. 19:

Whether any of the "Existing Agreements" identified on page SI_Tech-000721 in attached Attachment I encompass or convey any rights or interests in the Asserted Patents and, if so, the subject matter, terms, and conditions of those agreements.

EXHIBIT 35

3/24/2021

San Francisco to Waco | Google Flights



Sign in

Round trip ▾ 1 ▾ Economy ▾

San Fran...



Waco ACT



Sat, May 15

Mon, May 24

Stops ▾

Airlines ▾

Bags ▾

Price ▾

Times ▾

Connecting airports ▾

Duration ▾

More ▾



Date grid



Price graph



Active travel advisory

There's a government travel advisory related to coronavirus (COVID-19).

[More details](#)

Best departing flights ⓘ

Total price includes taxes + fees for 1 adult. [Additional bag fees](#) and other fees may apply.

Sort by: ↑↓



10:00 AM → 5:47 PM

SFO

ACT

\$311

round trip



1 stop in DFW · 5 hr 47 min · American · Operated by Envoy Air as American Eagle



1:18 PM → 9:37 PM

SFO

ACT

\$311

round trip



1 stop in DFW · 6 hr 19 min · American · Operated by Envoy Air as American Eagle



Prices are currently typical for your trip.

Details



Other departing flights







3:53 PM → 9:44 AM⁺¹

\$311



3/24/2021

San Francisco to Waco | Google Flights

SFO	ACT	round trip
1 stop in DFW  · 15 hr 51 min · American · Operated by Envoy Air as American Eagle		
	6:48 PM → 9:44 AM⁺¹	\$363
SFO	ACT	round trip
2 stops in LAX, DFW · 12 hr 56 min · American · Operated by Skywest Airlines as Ameri...		
	11:34 PM → 4:01 PM⁺¹	\$366
SFO	ACT	round trip
2 stops in ORD, DFW · 14 hr 27 min · American · Operated by Envoy Air as American Ea...		
	9:25 AM → 9:37 PM	\$489
SFO	ACT	round trip
2 stops in SEA, DFW · 10 hr 12 min · Alaska, American · Operated by Horizon Air as Ala...		
	11:34 PM → 11:54 AM⁺¹	\$526
SFO	ACT	round trip
2 stops in ORD, DFW · 10 hr 20 min · American · Operated by Envoy Air as American Ea...		
	23 more flights	

Hotels in Waco ⓘ

Nightly prices for 1 guest May 15–May 24

Search for hotels 

Magnolia House

4.6 ★★★★★ (96)

WoodSpring Suites
Waco

3.4 ★★★★★ (286)

 Language · English (United States)

Country · United States

Currency · USD

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EXHIBIT 37


3/24/2021

Santa Ana to San Francisco | Google Flights




Sign in

 Round trip ▾
  1 ▾
 Economy ▾

 Santa Ana


San Francisco



Sat, May 15

Mon, May 24

Stops ▾

Airlines ▾

Bags ▾

Price ▾

Times ▾

Connecting airports ▾

Duration ▾

More ▾



Date grid



Price graph



Active travel advisory

There's a government travel advisory related to coronavirus (COVID-19).

[More details](#)

Best departing flights ⓘ

Total price includes taxes + fees for 1 adult. [Additional bag fees](#) and other fees may apply.Sort by: 

6:45 AM → 8:14 AM

SNA

SFO

Nonstop · 1 hr 29 min · United

 \$97
round trip


8:05 AM → 9:34 AM

SNA

SFO

Nonstop · 1 hr 29 min · United

 \$97
round trip


10:15 AM → 11:44 AM

SNA

SFO

Nonstop · 1 hr 29 min · United

 \$97
round trip


3:18 PM → 4:47 PM

SNA

SFO

Nonstop · 1 hr 29 min · United · Operated by Skywest DBA United Express

 \$97
round trip


3/24/2021

Santa Ana to San Francisco | Google Flights

**7:30 PM**

SNA

8:55 PM

SFO

\$97

round trip



Nonstop · 1 hr 25 min · Alaska · Operated by Skywest Airlines as AlaskaSkyWest



Prices are currently typical for your trip.

Details



Other departing flights

Prices are not available for: Southwest Airlines.

**7:00 AM → 8:32 AM**

SNA

SFO

\$97

round trip



Nonstop · 1 hr 32 min · Alaska · Operated by Skywest Airlines as AlaskaSkyWest

**10:30 AM → 12:02 PM**

SNA

SFO

\$97

round trip



Nonstop · 1 hr 32 min · Alaska · Operated by Skywest Airlines as AlaskaSkyWest

**6:05 PM → 7:34 PM**

SNA

SFO

\$122

round trip



Nonstop · 1 hr 29 min · United · Operated by Skywest DBA United Express

**12:59 PM → 5:47 PM**

SNA

SFO

\$213

round trip



1 stop in PHX · 4 hr 48 min · American



42 more flights

Hotels in San Francisco ⓘ

Nightly prices for 1 guest May 15–May 24

Search for hotels

**FOUND Hotel San Francisco****\$44**

4.1 ★★★★★ (116)

**The Herbert Hotel****\$58**

3.8 ★★★★★ (420)



Language · English (United States)

Country · United States

3/24/2021

Santa Ana to San Francisco | Google Flights

Currency · USD

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Displayed currencies may differ from the currencies used to purchase flights. [Learn more](#)



EXHIBIT 38

3/24/2021

San Diego to San Francisco | Google Flights



Sign in

Round trip ▾ 1 ▾ Economy ▾



San Diego



San Fran...



Sat, May 15

Mon, May 24

Stops ▾

Airlines ▾

Bags ▾

Price ▾

Times ▾

Connecting airports ▾

Duration ▾

More ▾



Date grid



Price graph



Active travel advisory

There's a government travel advisory related to coronavirus (COVID-19).

[More details](#)

Best departing flights ⓘ

Total price includes taxes + fees for 1 adult. [Additional bag fees](#) and other fees may apply.

Sort by: ↑↓



8:32 AM → 9:57 AM

SAN

SFO

Nonstop · 1 hr 25 min · United

✈ \$97
round trip

11:20 AM → 12:45 PM

SAN

SFO

Nonstop · 1 hr 25 min · United

✈ \$97
round trip

5:31 PM → 6:52 PM

SAN

SFO

Nonstop · 1 hr 21 min · United

✈ \$97
round trip

6:48 PM → 8:13 PM

SAN

SFO

Nonstop · 1 hr 25 min · United

✈ \$97
round trip

3/24/2021

San Diego to San Francisco | Google Flights

**3:35 PM**

SAN

5:13 PM

SFO

\$117

round trip



Nonstop · 1 hr 38 min · Alaska · Operated by Skywest Airlines as AlaskaSkyWest



Prices are currently typical for your trip.

Details



Other departing flights

Prices are not available for: Southwest Airlines.

**7:15 AM → 8:56 AM**

SAN

SFO

\$97

round trip



Nonstop · 1 hr 41 min · United

**1:30 PM → 2:57 PM**

SAN

SFO

\$97

round trip



Nonstop · 1 hr 27 min · United

**4:24 PM → 5:55 PM**

SAN

SFO

\$97

round trip



Nonstop · 1 hr 31 min · United

**7:50 PM → 9:16 PM**

SAN

SFO

\$97

round trip



Nonstop · 1 hr 26 min · United

**6:30 AM → 8:08 AM**

SAN

SFO

\$117

round trip



Nonstop · 1 hr 38 min · Alaska · Operated by Skywest Airlines as AlaskaSkyWest

**11:00 AM → 12:38 PM**

SAN

SFO

\$117

round trip



Nonstop · 1 hr 38 min · Alaska · Operated by Skywest Airlines as AlaskaSkyWest

**5:55 PM → 7:33 PM**

SAN

SFO

\$117

round trip



Nonstop · 1 hr 38 min · Alaska · Operated by Skywest Airlines as AlaskaSkyWest

**8:05 PM → 9:43 PM**

SAN

SFO

\$117

round trip










Nonstop · 1 hr 38 min · Alaska · Operated by Skywest Airlines as AlaskaSkyWest



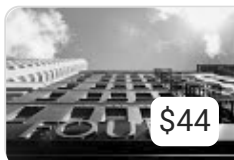
3/24/2021

San Diego to San Francisco | Google Flights

	5:28 PM SAN	10:43 PM SFO	\$137 round trip	▼
1 stop in SLC · 5 hr 15 min · Delta				
	6:15 AM → 7:57 AM SAN	SFO	 \$147 round trip	▼
Nonstop · 1 hr 42 min · United				
	8:00 AM → 9:35 AM SAN	SFO	Price unavailable	▼
Nonstop · 1 hr 35 min · Southwest				
	1:20 PM → 2:55 PM SAN	SFO	Price unavailable	▼
Nonstop · 1 hr 35 min · Southwest				
	4:30 PM → 6:05 PM SAN	SFO	Price unavailable	▼
Nonstop · 1 hr 35 min · Southwest				
	7:40 PM → 9:15 PM SAN	SFO	Price unavailable	▼
Nonstop · 1 hr 35 min · Southwest				
▼	31 more flights			

Hotels in San Francisco ⓘ

Nightly prices for 1 guest May 15–May 24

Search for hotels **FOUND Hotel San Francisco****\$44**

4.1 ★★★★★ (116)

**The Herbert Hotel****\$58**

3.8 ★★★★★ (420)

 Language · English (United States)

Country · United States

Currency · USD

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3/24/2021

San Diego to San Francisco | Google Flights

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EXHIBIT 39

4/2/2021

San Diego to Waco | Google Flights




Sign in

 Round trip ▾
  1 ▾
 Economy ▾

 San Diego


Waco ACT



Sat, May 15

Mon, May 24

Stops ▾

Airlines ▾

Bags ▾

Price ▾

Times ▾

Connecting airports ▾

Duration ▾

More ▾



Date grid



Price graph

Active travel advisory



There's a government travel advisory related to coronavirus (COVID-19).

[More details](#)

Best departing flights ⓘ

Total price includes taxes + fees for 1 adult. [Additional bag fees](#) and other fees may apply.Sort by: 

10:57 AM → 5:47 PM

SAN

ACT

\$311

round trip



1 stop in DFW · 4 hr 50 min · American · Operated by Envoy Air as American Eagle



2:43 PM → 9:37 PM

SAN

ACT

\$311

round trip



1 stop in DFW · 4 hr 54 min · American · Operated by Envoy Air as American Eagle


4:42 PM → 9:44 AM⁺¹

SAN

ACT

\$311

round trip


1 stop in DFW  · 15 hr 2 min · American · Operated by Envoy Air as American Eagle4:44 PM → 9:44 AM⁺¹

SAN

ACT

\$315

round trip

2 stops in PHX, DFW  · 15 hr · American · Operated by Envoy Air as American Eagle

4/2/2021





San Diego to Waco | Google Flights

Prices are currently typical for your trip.

Details



Other departing flights

	11:00 PM → 4:01 PM⁺¹ SAN ACT 2 stops in ORD, DFW · 15 hr 1 min · American · Operated by Envoy Air as American Eagle	\$413 round trip	▼
	7:05 AM → 9:37 PM SAN ACT 2 stops in SEA, DFW · 12 hr 32 min · Alaska, American · Operated by Envoy Air as Amer...	\$497 round trip	▼
	5:30 PM → 9:44 AM⁺¹ SAN ACT 2 stops in SEA, DFW · 14 hr 14 min · Alaska, American · Operated by Envoy Air as Amer...	\$497 round trip	▼
	11:00 PM → 11:54 AM⁺¹ SAN ACT 2 stops in ORD, DFW · 10 hr 54 min · American · Operated by Envoy Air as American Ea...	\$533 round trip	▼
▼	34 more flights		

Hotels in Waco ⓘ

Nightly prices for 1 guest May 15–May 24

Search for hotels **Magnolia House**

4.6 ★★★★★ (96)

**Extended Stay America - Wa...**

3.6 ★★★★★ (328)

\$51**WoodSpring Suites**

3.4 ★★

\$43 Language · English (United States)

Country · United States

Currency · USD

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4/2/2021

San Diego to Waco | Google Flights

Displayed currencies may differ from the currencies used to purchase flights. [Learn more](#)



EXHIBIT 41

Median Time to Trial

NDCA

WDTX

2.37

Years

2.62

Years

Median Time to Claim Construction

NDCA

1.47 Years

WDTX

1.33 Years

Year of Document Filing
2010 to 2020

Patent Technology Centers

- ☒ 1600 Biotechnology and Organi..
- ☒ 1700 Chemical and Materials E..
- ☒ 2400 Networking, Multiplexing, ..
- ☒ 2800 Semiconductors/Memory, ..
- ☒ 2900 Design
- ☒ 3600 Transportation, Constructi..
- ☒ 3700 Mechanical Engineering, ..
- ☒ Computers, Communication, an..
- ☒ Unclassified/Unknown

ANDA Cases

- ☒ ANDA Cases
- ☒ Non-ANDA Cases

Measure

- ☐ Average
- ☒ Median

Calculate Time In:

- ☐ Days
- ☒ Years

Milestone Selector

Select a Milestone using the menu below, then select one or more subcategories. Hover over sections of the chart to view additional information.

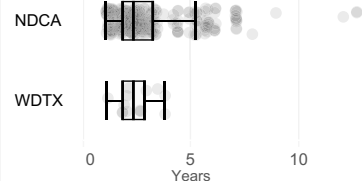
Choose a Milestone
Trials

Milestone Subcategories

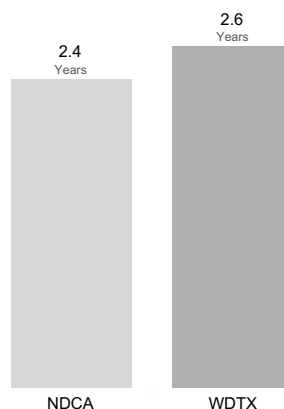
- ☒ Bench Trial
- ☒ Jury Trial

Time to Milestone

The chart displays the Years from case filing to the selected Milestone subcategories in cases filed in the selected courts or assigned to the selected judge.



Median Time to Trials Events



**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

SUPER INTERCONNECT
TECHNOLOGIES LLC,

Plaintiff,

vs.

GOOGLE LLC,

Defendant.

Civil Action No. 6:21-cv-259-ADA

JURY TRIAL DEMANDED

**JOINT MOTION REGARDING CASE MANAGEMENT AND DISCOVERY INTO
NEWLY-RELEASED PRODUCTS**

Plaintiff Super Interconnect Technologies LLC (“SIT”) and Defendant Google LLC (“Google”) (together, the “Parties”) seek to streamline certain aspects of this case by incorporating certain pleadings and evidence from a prior case between the Parties into the record of this case and by reducing the need for discovery into certain newly released products. In 2018, SIT filed its first lawsuit against Google in the Eastern District of Texas asserting the same three patents that are asserted in this case, U.S. Patent Nos. 7,627,044, 6,463,092, and 7,158,593 (“Asserted Patents”). That case, *Super Interconnect Technologies LLC v. Google LLC*, Case No. 2:18-cv-463 (E.D. Tex.) (“E.D. Tex. case”),¹ was stayed on February 20, 2020, and then dismissed for improper venue on March 12, 2021. SIT filed this case on March 15, 2021, asserting the same Asserted Patents and substantially the same allegations as in the E.D. Tex. case. Dkt. 1. Before the dismissal of the E.D. Tex. case, the Parties had completed claim

¹ The E.D. Tex. case was consolidated with a related case under lead Case No. 2:18-cv-462 (E.D. Tex.) (“462 case”) and certain filings and orders of the E.D. Tex. case were therefore filed only in the 462 case.

construction and fact discovery and served opening expert reports. The Parties respectfully request entry of an Order incorporating certain pleadings and evidence from the E.D. Tex. case and addressing discovery into newly released products, as follows:

I. MOTION REGARDING CASE MANAGEMENT AND DISCOVERY

In the interest of judicial economy, the Parties jointly move the Court to enter an Order including the following provisions to limit duplicative proceedings and discovery between the prior E.D. Tex. case and this case.

1. Any and all written discovery responses (including initial disclosures, responses to interrogatories, and responses to requests for admission), document productions, and deposition testimony (including transcripts and recordings) from either Party or from a third party that was served, produced, or obtained as part of the E.D. Tex. case can also be used in this case as if it had been served, produced, or obtained in this case.

2. Neither Party will rely on the fact that there is a second case to request a second or additional deposition of any Party or witness.

3. There will be no additional fact discovery in this case, except that SIT may request written and document discovery limited to (a) updated financial information for the Pixel products accused in the E.D. Tex. case — Pixel 1, Pixel 1 XL, Pixel 2, Pixel 2 XL, Pixel 3, Pixel 3 XL, Pixel 4, Pixel 4 XL (collectively “Previously Accused Pixel Products”), so long as the updated financial information is the same type as previously provided — and (b) financial information for the Pixel 4a, Pixel 4a 5G, and Pixel 5 products (“Newly Released Pixel Products”) released after February 1, 2020, so long as the financial information is the same type that was produced for the products listed in 3(a). There will be no other fact discovery regarding the Newly Released Pixel Products, in view of the joint motion below in Section III regarding those products obviates the need for such fact discovery.

4. The Parties will conduct no claim construction or *Markman* proceedings in this case in light of the joint motion below in Section II regarding claim construction.

5. Opening expert reports served in the E.D. Tex. case will also be used in this case as if they had been served and produced in this case. The Parties may serve supplements to the opening expert reports from the E.D. Tex. case, but that supplementation may only address the newly produced information as a result of I.3 above and/or the Motion Regarding Newly Released Pixel Products in Section III below.

6. Following the service of the opening expert reports and any supplements thereto, the Parties may serve rebuttal expert reports and complete expert discovery, including depositions of testifying experts.

II. MOTION TO FACILITATE CLAIM CONSTRUCTION

To streamline claim construction in this case, the Parties jointly move the Court to enter an Order incorporating the Parties' claim construction briefing and supporting papers filed therewith, the claim construction order, and notices filed relating to claim construction from the E.D. Tex. case into the docket for this case.

The Parties raised their claim construction arguments and proposals for the Asserted Patents in the prior E.D. Tex. case, and the court in the E.D. Tex. case spent significant time considering the Parties' claim construction arguments and rendered a number of rulings on claim construction. The Parties wish to incorporate and preserve those claim construction proposals, arguments, and briefs as part of the record in this case and to avoid burdening this Court with the need to conduct *Markman* proceedings in this case. The Parties therefore request that the Court issue an Order:

(1) preserving the Parties' rights to appeal the claim construction order from the E.D. Tex. case based on the claim construction record from the E.D. Tex. case for purposes of any such appeal;

(2) incorporating by reference the entire claim construction record from the prior E.D. Tex. case (i.e., all docket-numbered documents in which construction of claim terms is discussed or decided, listed in Table A below, including all exhibits and attachments filed with the listed documents) into the present case record as if the filings were made herein for the purposes of appeal;

Table A - Incorporated Docket Entries From *Super Interconnect Technologies LLC v. Google LLC*, Case No. 2:18-cv-463 (E.D. Tex.) And Lead Case No. 2:18-cv-462 (E.D. Tex.)

E.D. Tex. Case No.	Dkt. No.	Title	Entry Date
2:18-cv-462	47	P.R. 4-3 Joint Claim Construction And Prehearing Statement	Aug. 14, 2019
2:18-cv-462	59	Plaintiff Super Interconnect Technologies LLC's Opening <i>Markman</i> Brief	Sept. 25, 2019
2:18-cv-462	64	Defendants' Responsive Claim Construction Brief	Oct. 16, 2019
2:18-cv-462	65	Sealed Additional Attachments To Dkt. No. 64 Response Claim Construction Brief	Oct. 16, 2019
2:18-cv-462	67	Plaintiff Super Interconnect Technologies LLC's Reply <i>Markman</i> Brief	Oct. 23, 2019
2:18-cv-462	69	P.R. 4-5(D) Joint Claim Construction Chart	Oct. 30, 2019
2:18-cv-462	73	Order Of Limited Referral	Nov. 13, 2019
2:18-cv-462	79	Plaintiff Super Interconnect Technologies LLC's Supplemental Reply <i>Markman</i> Brief	Nov. 20, 2019
2:18-cv-462	93	Claim Construction Memorandum and Order	Jan. 6, 2020
2:18-cv-462	96	Defendant Google LLC's Objections Pursuant To Rule 72(a) Of The Magistrate Judge's Claim Construction Opinion And Order (Dkt. 93)	Jan. 21, 2020
2:18-cv-462	97	Order	Jan. 23, 2020
2:18-cv-462	99	Transcript of Dec. 18, 2019 Claim Construction Hearing Before The Honorable Judge Roy S. Payne United States Magistrate Judge	Feb. 13, 2020

(3) ordering the Parties to file, under one docket number in the current case, the entire claim construction record from the prior E.D. Tex. case (i.e., all docket-numbered documents in

which construction of claim terms is discussed or decided, listed in Table A above, including all exhibits and attachments filed with the listed documents); and

(4) adopting the following claim constructions, consistent with the Claim Construction Memorandum and Order in the E.D. Tex. case (No. 2:18-cv-462 Dkt. 93):

Disputed Terms And Constructions

Claim Term	Court's Construction
“An apparatus for transmitting a clock signal and data signals over a signal line” '092 patent, claim 1	Preamble limiting
“control signal” '092 patent, claim 1 '044 patent, claims 1, 8, 13	“a signal, distinct from the data signal, that controls some aspect of recording, processing, transmission, or interpretation”
“channel” '593 patent, claim 34 '044 patent, claims 1, 8, 9, 13, and 19	“a path along which a signal can be sent toward a receiver or can be received from a transmitter”
“direct current balancing control signals” '044 patent, claims 1, 8, 13	“signals designed to affect the direct current balance of a signal”
“the clock generator modulating a falling edge of an output signal to indicate different data values” '092 patent, claim 1	“the clock generator modulating a falling edge of the clock signal input to the clock generator to indicate different data values”
“clock channel” '593, claim 34	“a channel for carrying a clock signal or a signal that includes a clock signal (such as a combined clock and data signal)”
“shifts an energy spectrum of the combined clock and encoded data signal away from an effective loop bandwidth of a clock recovery block” '593 patent, claim 34	“shifts an energy spectrum of the combined clock and encoded data signal away from the pass range of a clock recovery block.”

Agreed Constructions

Claim Term (patent no., claim no.)	Agreed Construction
“A method of transmitting data in a system including at least one data channel and a separate clock channel” '593 patent, claim 34	preamble limiting
“clock signal” '092 patent, claim 1; '593 patent, claims 34, 35; '044 patent, claims 1, 8, 13	“signal with uses that include timing or synchronization”
“the clock signal is pulse width modulated” '044 patent, claims 1, 13	plain and ordinary meaning
“pulse width modulated clock signal” '044 patent, claims 8, 13	plain and ordinary meaning
“data words” '593 patent, claim 34	plain and ordinary meaning
“effective loop bandwidth of a clock recovery block” '593 patent, claim 34	“frequency pass range of a clock recovery block”
“duty cycle” '044 patent, claims 2, 3	“the ratio of a pulse width to a period”
“duty cycle position” '044 patent, claims 2, 3	“specified ratio of a pulse width to a period”

III. MOTION REGARDING NEWLY RELEASED PIXEL PRODUCTS

In the E.D. Tex. case, SIT accused of infringement the Previously Accused Pixel Products on the basis that they contained flash memory components and Qualcomm processors that allegedly implemented two technology standards: Universal Flash Storage (UFS), versions 2.0 and 2.1, and MIPI M-PHY, version 3.0. Since the E.D. Tex. case was stayed on February 20,

2020, Google released and offered for sale the Newly Released Pixel Products. The Newly Released Pixel Products contain flash memory components and Qualcomm processors that allegedly implement the UFS and M-PHY standards. To streamline discovery and conserve time and resources expended in satisfying their discovery obligations regarding the Newly Released Pixel Products, Google and SIT jointly move the Court to enter an Order including the following provisions:

1. For purposes only of determining infringement and/or non-infringement of the asserted claims of the Asserted Patents, and for purposes only of the above-captioned litigation, neither party will contend that there are material differences between the functionality in the software and hardware for the Newly Released Pixel Products and the functionality in the software and hardware for any of the Previously Accused Pixel Products. Google will not contend that SIT has failed to prove infringement, nor will SIT contend that Google has failed to prove non-infringement, of any of the Newly Released Pixel Products on the ground that the evidence of infringement or non-infringement presented relates only to the Previously Accused Pixel Products.

2. Google's discovery obligations related to the design, structure, and operation of the Newly Released Pixel Products are discharged. SIT shall not argue, present evidence, or suggest in any hearing or trial of this action for any purpose that Google's production of documents, deposition testimony, or interrogatory responses with respect to technical information for any of the Newly Released Pixel Products was deficient or incomplete.

3. This motion does not alter Google's obligations with regard to producing financial information, as detailed above in Section I.3, and does not alter SIT's burden regarding proving damages as to all accused products.

4. This motion does not constitute, and will not be offered or construed as, evidence or admission by Google that it is liable for patent infringement under 35 U.S.C. § 271, in whole or in part, which Google specifically denies. Nothing in this motion shall be construed as evidence or as an admission by Google that any Google product, including any product identified in this motion, infringes, in whole or in part, any claim of the Asserted Patents.

5. This motion applies only to the Newly Released Pixel Products (i.e., Pixel 4a, Pixel 4a 5G, and Pixel 5) and does not apply to any future or unaccused Google product, including any future or unaccused Google Pixel product.

6. This motion is to be used only in the above-captioned litigation, including the exhaustion of all appeals from this litigation. This motion shall not be binding on any party in any other administrative or judicial proceeding; nor does any party waive the right to object to the admissibility of this motion in any other proceeding.

Dated: May 12, 2021

Respectfully submitted,

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/s/ J. Mark Mann

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CERTIFICATE OF SERVICE

Pursuant to the Federal Rules of Civil Procedure and Local Rule CV-5, I hereby certify that, on May 12, 2021, all counsel of record who have appeared in this case are being served with a copy of the foregoing via the Court's CM/ECF system.

Dated: May 12, 2021

/s/ J. Mark Mann

J. Mark Mann

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

**SUPER INTERCONNECT
TECHNOLOGIES LLC,**

Plaintiff,

v.

GOOGLE LLC,

Defendant.

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Civil Action No. 6:21-cv-259-ADA

JURY TRIAL DEMANDED

**PLAINTIFF'S RESPONSE IN OPPOSITION TO DEFENDANT'S MOTION TO
TRANSFER VENUE UNDER 28 U.S.C. § 1404**

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I. INTRODUCTION

Transfer of venue in this case would cause yet another delay in an already protracted litigation. This dispute began on November 2, 2018, when Plaintiff Super Interconnect Technologies LLC (“SIT”) filed suit against Defendant Google LLC (“Google”) in the Eastern District of Texas (“EDTX”). The parties litigated the matter for over two years, have already completed claim construction, completed fact discovery, and served opening expert reports. And not once did Google ever allege that proceeding in a Texas forum was inconvenient. Moreover, despite moving for dismissal under 28 U.S.C. § 1406(a), Google never asserted that transfer of the case outside of Texas was in the “interest of justice,” either prior to or after the Federal Circuit’s mandate. Despite engaging in substantive litigation in this case for years in a Texas forum, Google now claims that proceeding in this District is somehow inconvenient. Tellingly, Google does not even attempt to justify its substantial delay in moving to transfer to the Northern District of California (“NDCA”). Nor does it explain why litigating in this District is more inconvenient than the EDTX, the forum in which it litigated for over two years.

Given the significant case progress achieved in the EDTX, and the Court’s Order Granting Joint Motion Regarding Case Management and Discovery into Newly-Released Products (Dkt. 31), the typical convenience factors carry far less weight. This case is at an advanced stage. With the exception of supplemental financial information, fact discovery is complete. SIT already possesses Google’s document production, which resides at SIT’s outside counsel’s office in Dallas, Texas, so location of documents is a non-factor. Fact witnesses have already been deposed. Google is unable to identify any witness — “key” witness or otherwise — that is unwilling or unable to attend trial in this District. Google likewise identifies no willing witness that it intends to call at trial. In contrast, SIT identifies three witnesses that it intends to call at trial, each declaring

that proceeding in this District would not be inconvenient. As the case nears trial, Google cannot show — as it must to justify transfer under 28 U.S.C. § 1404(a) — that it is “clearly more convenient” to proceed in the NDCA, a district that describes itself as experiencing an “extraordinary disruption” because of the COVID-19 pandemic. Conversely, this Court has demonstrated that it can safely and efficiently conduct trials. Given the advanced posture of this case, here is no question that this matter can come to trial and be resolved more quickly if the Court denies transfer. The Court should reject Google’s attempt to delay resolution of this dispute.

II. BACKGROUND

This lawsuit is a continuation of a case that SIT filed in the Eastern District of Texas over two and a half years ago. Dkt. 29 at 1, 3–4. During the EDTX Action, Google filed a motion to dismiss the EDTX Action for improper venue under § 1406(a). *Id.* at 1. Notably, Google sought only dismissal, did not argue that the case should be transferred outside of Texas in the interest of justice, and did not seek a stay of the EDTX Action pending (or even after) resolution of its motion to dismiss. *Id.* at 1–2. Further, Google did not move to transfer the EDTX Action under § 1404(a), even after the district court denied its motion to dismiss under § 1406(a). As a result, the parties diligently prepared the EDTX Action for trial, completing *Markman* and fact discovery and serving opening expert reports. Dkt. 16 at 3; Dkt. 29 at 2–3. After claim construction briefing and a *Markman* hearing, the EDTX court entered a claim construction order, construing the relevant claims of the patents-in-suit. Case No. 2:18-cv-00462-JRG, ECF No. 93.

The efficient progress of this case continues before the Court. On May 14, 2021, the Court granted the parties’ Joint Motion Regarding Case Management and Discovery into Newly-Released Products. Dkt. 31. Pursuant to the Court’s order, “[a]ll written discovery responses ... , document productions, and deposition testimony ... from either Party or from a third party that

was served, produced, or obtained as part of the [EDTX Action] will also be used in the present case as if it had been served, produced, or obtained in this case.” *Id.* at 1. Further, other than supplemental financial information, “[t]here will be no additional fact discovery in this case.” *Id.* at 2. The opening expert reports served in the EDTX Action will be treated as if they were served in this case. *Id.* Because the Court has adopted the claim constructions from the EDTX Action, there will be no claim construction or *Markman* proceeding. *Id.* at 2–5.

The parties recently requested that the EDTX court amend its Protective Orders to allow the parties to maintain the produced documents — as well as other confidential material, including confidential deposition transcripts — and use the confidential information in this case. Case No. 2:18-cv-00462-JRG, ECF No. 112. Non-party Qualcomm did not oppose the motion. *Id.* While the EDTX court denied the motion, it agreed to “readily reconsider” the matter after the Court enters a protective order in this matter. *Id.*, ECF No. 113 at 2. Based on the EDTX court’s order, the parties promptly filed a Joint Motion for Protective Orders on May 17, which the Court has now granted. *See* Dkt. 32, 33. Importantly, neither the parties nor Qualcomm has agreed to allow use of confidential information in any forum other than this District. Thus, proceeding in this forum under the Court’s orders already entered will ensure that the parties can proceed to trial without needlessly expending any time or expense to redo discovery. Whether the same would be true in the NDCA is, at best, unclear.

The parties’ document production from the EDTX Action is electronic. And all of the parties’ documents currently reside on the servers of SIT’s outside counsel in nearby Dallas, Texas. Declaration of Jeffrey R. Bragalone ¶ 2. As the parties completed fact discovery and served opening expert reports in the EDTX Action, a clear picture emerged of the witnesses who will be required at trial. During fact discovery, SIT identified three witnesses — two party witnesses and

one non-party witness — all of which expect to testify at trial. Declarations of Hernandez ¶¶ 4, 7, Booth ¶ 4, and Lucas ¶ 5. Each of SIT’s corporate representatives has averred that providing testimony in Waco would not be inconvenient. *Id.* In contrast, Google has not identified any witness that it intends to call at trial. *See* Dkt. 14 at 3-4, 7-8.

III. ARGUMENTS AND AUTHORITIES

“For the convenience of parties and witnesses, in the interest of justice, a district court may transfer any civil action to any other district or division where it might have been brought.” 28 U.S.C. § 1404(a). A motion to transfer venue under § 1404(a) should be granted only upon a showing that the transferee venue is “clearly more convenient.” *In re Nintendo Co.*, 589 F.3d 1194, 1197 (Fed. Cir. 2009); *In re Volkswagen of Am., Inc.*, 545 F.3d 304, 315 (5th Cir. 2008) (en banc). It is Google’s burden to demonstrate that the proposed transferee venue is clearly more convenient. *See Volkswagen*, 545 F.3d at 315. Therefore, the Court should draw reasonable inferences and resolve factual conflicts in favor of SIT. *See Weatherford Tech. Holdings, LLC v. Tesco Corp.*, No. 2:17-CV-00456-JRG, 2018 WL 4620636, at *2 (E.D. Tex. May 22, 2018). As such, SIT’s choice of forum is given deference, and the statute “places a significant burden on the movant to show good cause for the transfer.” *Volkswagen*, 545 F.3d at 315 n.10. District courts have “broad discretion in deciding whether to order a transfer.” *Balawajder v. Scott*, 160 F.3d 1066, 1067 (5th Cir. 1998). Fifth Circuit law controls the § 1404 analysis. *See Nintendo*, 589 F.3d at 1197.

“Parties seeking a change of venue should act with reasonable promptness.” *Peteet v. Dow Chem. Co.*, 868 F.2d 1428, 1436 (5th Cir. 1989) (quotations omitted). While “garden-variety delay” does not justify denial of a § 1404(a) motion, denial is appropriate “where a transfer of venue would have caused yet another delay in an already protracted litigation.” *In re Radmax, Ltd.*, 720 F.3d 285, 289 (5th Cir. 2013) (quotations omitted). Thus, courts in this Circuit have denied

transfer motions where the moving party engages in substantive litigation for over six months before filing a § 1404(a) motion. *See, e.g., In re Hughes Network Sys., LLC*, No. 17-130, 2017 WL 3167522, at *1 (Fed. Cir. July 24, 2017) (finding no clear abuse of discretion in denial of § 1404(a) motion that was filed 16 months after case was filed); *In re Wyeth*, 406 F. App'x 475, 477 (Fed. Cir. 2010) (finding no clear abuse of discretion in denial of § 1404(a) motion that was filed after “discovery was conducted, protective orders were issued, individual disclosures were turned over, infringement and invalidity contentions were exchanged, and an extensive amount of documents were produced”); *Peteet*, 868 F.2d at 1436 (affirming denial of motion to transfer that was filed 18 months after the case was remanded to the district court); *Diem LLC v. BigCommerce, Inc.*, No. 6:17-CV-00186-JRG, 2017 WL 6729907, at *5 (E.D. Tex. Dec. 28, 2017) (denying motion to transfer that was filed over eight months after case was filed).

Though Google may allege that its delay should not weigh against transfer because the instant action before this Court was recently commenced, such an argument would ignore key rationales that underlie the decisions that have denied motions to transfer based on inordinate delay, i.e., the fact that the case has progressed to an advanced stage, and that transfer would create further delay and waste judicial resources. *See Radmax*, 720 F.3d at 289 (holding that delay may be a basis for denial of transfer “where a transfer of venue would have caused yet another delay in an already protracted litigation”) (quotations omitted); *see also Wyeth*, 406 F. App'x at 477 (“Without reasonable promptness on the part of the movant, a case proceeds, requiring the court to expend time and effort that might become wasted upon transfer.”). Google cannot deny the fact that this case is at an advanced stage; indeed, Google’s joint filings belie any claim that the case is not significantly closer to trial than the typical newly-filed case. Similarly, the parties have already expended significant efforts to streamline the disposition of this case before this Court, and such

efforts would need to be re-done were the case to be transferred, and an unknown district court might not be as willing to accept the claim construction of the EDTX Action. Thus, the same rationales for denying motions to transfer due to inordinate delay apply with equal force to the instant case – Google delayed any motion to transfer until this dispute was significantly advanced, and a transfer would likely cause further, unwarranted delays.

The § 1404 analysis turns on several factors: (1) the administrative difficulties flowing from court congestion; (2) practical problems that make trial of a case easy, expeditious, and inexpensive (3) the relative ease of access to sources of proof; (4) the availability of compulsory process to secure the attendance of witnesses; (5) the cost of attendance for willing witnesses; (6) the local interest in having localized interests decided at home; (7) the familiarity of the forum with the law that will govern the case; and (8) the avoidance of unnecessary problems with conflicts of law. *Volkswagen*, 545 F.3d at 315. The factors “are not necessarily exhaustive or exclusive,” and no single factor is dispositive. *Id.* Convenience is typically analyzed based on “the situation which existed when suit was instituted.” *Hoffman v. Blaski*, 363 U.S. 335, 343 (1960). However, “the unique procedure of [a] case and significant delay in the filing of [a transfer] motion must be considered in the transfer analysis.” *Diem*, 2017 WL 6729907, at *5.

A. The “Practical Problems” Factor Weighs Heavily Against Transfer.

When considering the private interest factors, courts must consider “all other practical problems that make trial of a case easy, expeditious and inexpensive.” *Volkswagen*, 545 F.3d at 314. “Practical problems include those that are rationally based on judicial economy.” *Wahlstrom v. B & A Carrier LLC*, No. 2:18-cv-00313-JRG, 2019 WL 130296, at *4 (E.D. Tex. Jan. 8, 2019). A party’s delay in filing a motion to transfer is considered under this factor. *Diem*, 2017 WL 6729907, at *4–5.

Google ignores the fact that transfer would cause even further delay, and result in prejudice

to SIT. Google engaged in over two years of litigation in this dispute before it filed a motion to transfer. In that time, the parties completed fact discovery and *Markman* proceedings and served opening expert reports, yet Google never requested transfer of the case outside of Texas. Google does not attempt to justify its delay in moving to transfer this case. Nor does Google explain how litigating in this District would be more inconvenient than in the EDTX, where it willingly litigated for over two years without seeking a stay pending its motion to dismiss or seeking transfer. Nor does Google attempt to explain why, if NDCA was more convenient, it did not seek to have the case transferred in the “interests of justice” under § 1406(a) rather than simply dismissed without prejudice. Given Google’s significant delay in seeking transfer, and the advanced stage of this case, this factor weighs heavily against transfer. *See, e.g., Hughes*, 2017 WL 3167522, at *1; *Wyeth*, 406 F. App’x at 477; *Peteet*, 868 F.2d at 1436; *Diem*, 2017 WL 6729907, at *5.

While Google argues that “[t]his factor is neutral, as neither the WDTX nor the NDCA has experience with the Patent-in-Suit,” (Dkt. 14 at 12), Google fails to consider that both the parties *and* the Court have now agreed that the immense discovery efforts in the EDTX Action may be reused in this matter. *See* Dkt. 31. During the course of the EDTX Action, the parties and non-party Qualcomm produced confidential information, which the initial EDTX Protective Orders required the parties to return or destroy. *See* Ex. C at 1-3. Rather than destroy the confidential information, the parties and Qualcomm agreed that the parties could maintain the documents for use in this matter. *Id.* As such, the parties moved the EDTX court to modify the Protective Orders in the EDTX Action, which will allow the parties to reuse all produced confidential information in this matter. *Id.* There are significant efficiencies that result from these agreements. However, there is no agreement between the parties or Qualcomm that would permit the confidential information to be used in a new matter before a NDCA court. Moreover, it is unclear whether a NDCA court

would agree to adopt the EDTX’s claim construction rulings or allow the parties to reuse discovery, and any argument to the contrary by Google would be mere speculation. As such, proceeding in this District is unquestionably more practical and efficient than proceeding under an unknown schedule and under the uncertain requirements of a court in the NDCA.

B. The “Court Congestion” Factor Weighs Heavily Against Transfer.

The relevant inquiry under the “court congestion” factor is “[t]he speed with which a case can come to trial and be resolved.” *In re Genentech, Inc.* 566 F.3d 1338, 1347 (Fed. Cir. 2009). There is no question that the Court is fully equipped to resolve this case at trial more quickly than a NDCA court. The parties have been litigating this dispute for over two years. Dkt. 14 at 2. The parties completed *Markman* and fact discovery in the EDTX Action and served opening expert reports. Dkt. 16 at 1. Moreover, the parties will jointly propose a case schedule that continues where the EDTX Action left off. *Id.* As such, this case is nearing trial. And while the Court is fully equipped to handle an in-person jury trial — a NDCA court is not.

The Court has amply demonstrated its ability to conduct in-person jury trials in a safe and efficient manner during the COVID-19 pandemic. Since October 2020, the Court has held numerous in-person jury trials. *See Ecofactor, Inc. v. Vivint, Inc.*, No. 6:20-cv-00080-ADA, 2021 WL 1535414, at *6 (W.D. Tex. Apr. 16, 2021). The Court has pronounced that it “is fully open and equipped to safely conduct jury trials in the COVID-19 pandemic.” *Id.*

In contrast, “the NDCA suspended all criminal and civil jury trials until at least early 2021.” *id.*; as of the time of Google’s Motion to Transfer, the NDCA has not fully reopened. According to the NDCA’s website, “access to all [NDCA] courthouses ... remains temporarily restricted to the public until further notice” because of “the continuing COVID-19 public health emergency.” Ex. A, NDCA Notice (Dec. 15, 2020). Indeed, the NDCA Chief Judge recently reauthorized an order stating that COVID-19 is causing an “extraordinary disruption throughout” the district:

[T]he current public health crisis has caused, is causing, and is expected to continue to cause extraordinary disruption throughout this District, including but not limited to: the temporary closure of offices; the imposition of travel restrictions and discouragement of the use of mass transportation; the dislocation of many residents; disruptions and delays in the use of the mails; reduction of court staff scheduled to work in-person at each courthouse due to the physical distancing recommendations of public health officials; and impact on the availability of parties, attorneys, witnesses and court staff to appear in court due to contact-tracing and self-isolation measures upon exposure to COVID-19.

Ex. B, NDCA General Order No. 74 (March 15, 2021). Even assuming NDCA courts begin to reopen soon, the courts can expect a significant backlog after such a lengthy closure. This case is nearing trial, and no NDCA court is currently equipped to handle the fast-approaching trial in a timely, efficient, and safe manner.

Even without the NDCA’s backlog caused by the pandemic, “[t]his Court’s default schedule would lead to a trial date much sooner than the average time to trial in the NDCA.” *Ecofactor*, 2021 WL 1535414, at *6. In its Motion, Google resorts to citing statistics that span the entirety of the WDTX and NDCA over the *last decade*, i.e., the years 2010–2020. But such a broad swath of data is not representative of the facts that apply to this case. As an initial matter, the Court has only existed for approximately 2.5 years. Stale statistics for the entire Western District that cover the last decade have little to no relevance to the Court’s analysis. Looking at current statistics more relevant to the facts of this case, in the year 2020, cases that went to trial were terminated nearly 1.5 years more quickly in this District than NDCA. *See* Ex. H, Caseload Statistics, Table C-3 (20 months vs. 36.2 months). Moreover, the time to trial in this Court — especially in patent cases — is likely much shorter than the District as a whole.

Further, this factor weighs even more heavily against transfer given Google’s delay in seeking transfer. *See Core Wireless Licensing S.A.R.L. v. LG Elecs. Inc.*, No. 2:14-CV-912-JRG-RSP, 2016 WL 4265034, at *2, 9 (E.D. Tex. Aug. 12, 2016) (finding that this factor weighs against transfer when the movant waited “nearly seven months after the filing of [the] Complaint”).

C. The “Sources of Proof” Factor Weighs Against Transfer.

“In considering the relative ease of access to proof, a court looks to where documentary evidence, such as documents and physical evidence, is stored.” *Fintiv Inc. v. Apple Inc.*, No. 6:18-cv-00372, 2019 WL 4743678, at *2 (W.D. Tex. Sept. 10, 2019). “[T]he question is relative ease of access, not *absolute* ease of access.” *Radmax*, 720 F.3d at 288 (emphases in original). “[P]atent litigation usually involves sources of proof that are readily convertible to an electronic medium.” *Aloft Media, LLC v. Adobe Sys. Inc.*, No. 6:07-CV-355, 2008 WL 819956, at *4 (E.D. Tex. Mar. 25, 2008). “With the volume of documentary evidence associated with a patent case, it is presumed that the parties will exchange discovery electronically. Any convenience or burden associated with electronic discovery bears little, if any, relation to the physical location of the underlying document.” *Id.*; see also *Fintiv, Inc. v. Apple Inc.*, No. 6:18-CV-00372-ADA, 2019 WL 4743678, at *2 (W.D. Tex. Sept. 13, 2019) (collecting cases). As such, “[t]he importance of the location of sources of proof is largely a fiction,” and the Court may “diminish[] the importance of this factor in the overall transfer analysis, especially where, as is the case here, the movant has identified no sources of proof that cannot be transferred electronically.” *Stingray Music USA, Inc. v. Music Choice*, No. 2:16-CV-964-JRG-RSP, 2017 WL 1022741, at *3 (E.D. Tex. Mar. 16, 2017).

The parties completed fact discovery in the EDTX Action, and — except for source code — all documents were produced electronically, as is typical. Bragalone Dec. ¶ 2. Each of the produced documents reside on the server of SIT’s outside counsel in Dallas, Texas. *Id.* The only non-electronic document productions from the EDTX Action involve source code printouts from non-party Qualcomm. *Id.* ¶¶ 2, 3. A copy of those printouts reside in a secure area in the offices of SIT’s outside counsel in Dallas, Texas. *Id.* ¶ 2. As such, copies of all relevant documents from the EDTX Action reside near the District in Dallas, Texas. While the parties expect Google to produce supplemental financial discovery for more recent periods (Dkt. 30 at 2), there is no reason to

believe that Google will not produce those documents electronically to SIT's outside counsel in Dallas, just as it did with each of its previous document productions. The vast majority of the evidence in this matter is electronically available. And the only physical documents of record are stored near the District in Dallas, Texas. As such, this factor either weighs slightly against transfer or is, at most, neutral.

D. The “Compulsory Witnesses” Factor Does Not Favor Transfer.

To carry its burden with respect to this factor, Google must identify witnesses that are unwilling to attend trial. “When no party has alleged or shown any witness’s unwillingness, a court should not attach much weight to the compulsory process factor.” *CloudofChange, LLC v. NCR Corp.*, No. 6-19-CV-00513, 2020 WL 6439178, at *4 (W.D. Tex. Mar. 17, 2020). Further, Google must show that such unwilling witnesses will actually be called at trial; the burden is not met where the movant provides little evidence as to what the witnesses would testify to and no statement as to which of the non-party witnesses, if any, will be called to testify. *Ecofactor*, 2021 WL 1535414, at *4. The record lacks any evidence — or even statement — that any non-party is unwilling to testify. Moreover, even though this case is at an advanced stage, Google, tellingly, does not provide any statement that it intends to call any non-party witness at trial.¹

None of the third parties support transfer under this factor because there is no evidence or statement of unwillingness, and there is no reason to expect any of the non-parties to be called at trial. The Motion identifies three types of non-parties: a vague reference to “employees at Qualcomm’s San Diego headquarters”; two inventors deposed in the EDTX Action; and a Lattice employee who provided a business records declaration in the EDTX Action. Dkt. 14 at 11. The “employees at Qualcomm’s San Diego headquarters” do not support transfer. Although the parties

¹ The Court should disregard any attempt by Google to use its Reply to add new evidence that it failed to adduce in its Motion.

completed fact discovery in the EDTX Action, Google is unable to identify a single Qualcomm employee that has any relevant, material knowledge. Moreover, individuals in San Diego are nearly 500 miles from the nearest NDCA court (Bragalone Dec. ¶ 4), and Google makes no showing or statement that an individual from San Diego could travel to the NDCA without incurring substantial expense. *See* Fed. R. Civ. P. 45(c)(1)(A). Thus, Google fails to show the unidentified Qualcomm employees in San Diego are within the subpoena power of the NDCA.

Two inventors were deposed in the EDTX Action. Even after having the benefit of depositions, Google is unable to identify what relevant, material knowledge either inventor possesses. *See* Dkt. 14 at 6, 11. Moreover, Google does not state that it intends to call either inventor at trial and, to the extent any unidentified testimony would be helpful, is unable to explain why deposition testimony presented at trial would be insufficient.

Lastly, Google identifies Jaime Garcia, who was not even deposed in the EDTX Action, but merely provided a business records declaration for Lattice Semiconductor. Dkt. 14 at 6. This is not the type of testimony that is necessary for trial, and Google makes no assertions to the contrary. Because the record lacks any evidence of allegation of any unwilling witness that will be called at trial, this factor does not favor transfer.

E. The “Cost to Willing Witnesses” Weighs Against Transfer.

This factor focuses on the cost of attendance for willing witnesses. *Seven Networks, LLC v. Google LLC*, No. 2:17-CV-00442-JRG, 2018 WL 4026760, at *7 (E.D. Tex. Aug. 15, 2018). However, “the convenience of party witnesses is given little weight.” *SynKloud Techs., LLC v. Dropbox, Inc.*, No. 6:19-cv-00525-ADA, 2020 WL 2494574, at *4 (W.D. Tex. May 14, 2020); *Ecofactor*, 2021 WL 1535414, at *5 (“Courts properly give more weight to the convenience of non-party witnesses than to party witnesses.”).

Again, even though this case is at an advanced stage, Google provides no indication of

which witnesses, if any, it intends to call at trial. Instead, Google merely identifies witnesses that sat for deposition, without stating whether the witness will provide live testimony at trial or why deposition testimony would be insufficient. Dkt. 14 at 3-4, 7-8. That Google representatives may have sat for deposition has little or no bearing on the Court's analysis of this factor. Instead, this factor focuses on the cost for willing witnesses to *attend trial*. See *Hockenbergs Equip. & Supply Co. v. Team Contractors, LLC*, No. EP-18-CV-00346-MAT, 2019 WL 11553491, at *2 (W.D. Tex. June 14, 2019) (discussing the “costs of attendance at trial”). Of course, a witness who has already been deposed will not be further inconvenienced if the witness does not attend trial. Google does not identify any willing witness that it intends to call at trial and therefore does not show that this factor favors transfer.

SIT, on the other hand, identifies three willing witnesses that expect to be called at trial. First, **Holly Hernandez** is a non-party witness who has knowledge that directly supports SIT's case-in-chief. Hernandez Dec. ¶¶ 3, 4, 7. Ms. Hernandez is a former Director and Senior Vice President of SIT. *Id.* ¶ 3. Ms. Hernandez has knowledge of SIT's corporate structure, SIT's business model, and the services SIT provides. Ex. D (Hernandez Dep. Tr.) at 11. And indeed, Ms. Hernandez has previously testified at trial with respect to these same types of issues. *Id.* at 9. Ms. Hernandez lives and works in Frisco, Texas. Hernandez Dec. ¶¶ 5, 6. As such, Ms. Hernandez can “travel to Waco, Texas to provide testimony without the need of securing a flight or overnight lodging accommodations.” *Id.* ¶ 8. Travel to the NDCA, on the other hand, would be “far less convenient and far more expensive.” *Id.*

Eric Lucas intends to willingly testify at trial. Lucas Dec. ¶ 5. Mr. Lucas is the president of SIT, and lives and works in Irvine, California. *Id.* ¶¶ 2, 3. Mr. Lucas has relevant knowledge related to “assignments and essentially how the patents became owned or assigned to SIT today,

License Agreements, financial performance since 2012 as well as some issues relating to damages and priority dates and conception to practice.” Ex. E, Lucas Dep. Tr. at 14. Mr. Lucas declared that travel to Waco for trial would be convenient. Lucas Dec. ¶ 6. While travel to Waco would require airfare and overnight lodging, travel from Irvine to a NDCA court would also require airfare and overnight lodging. *Id.*

Marc Booth will also testify at trial. Booth Dec. ¶ 4. Mr. Booth is the Chief Executive Officer of SIT and also lives and works in Irvine, California. *Id.* ¶¶ 2, 3; Ex. F, Booth Dep. Tr. at 49-50. Mr. Booth has relevant knowledge related to, among many other things, the origination and management of SIT’s patent portfolio. *Compare* Ex. F at 7, *with* Ex. G, Google’s Rule 30(b)(6) Notice. Mr. Booth declared that travel to Waco for trial would be convenient. Booth Dec. ¶ 6. As with Mr. Lucas, while travel to Waco would require Mr. Booth to secure airfare and overnight lodging, travel from Irvine to a NDCA court would also require airfare and overnight lodging. *Id.*

Given the typical time limits at trial, parties generally call, in addition to expert witnesses, “no more than a few party witnesses — and even fewer third-party witnesses.” *Ecofactor*, 2021 WL 1535414, at *5. Although Google identified five party witnesses that sat for deposition (Dkt. 14 at 4), it does not state that any of them will be called at trial and further does not identify any non-party willing witnesses.² Conversely, SIT identifies two party witnesses and one non-party witness that it intends to call at trial. The party witnesses aver that trial in Waco would not be inconvenient and the non-party witness declared that trial in Waco would be far more convenient. Given that the convenience of party witnesses is afforded little weight, whatever weight is afforded to this factor favors denial of transfer.

² Google mentions in passing, and with no evidence, that there could perhaps be willing non-party witnesses under the “compulsory process” factor. Dkt. 14 at 9, 11.

F. The “Localized Interests” Factor Does Not Support Transfer.

There can be little doubt that a district court “has a local interest in the disposition of any case involving a resident corporate party.” *Intellectual Ventures I LLC v. T-Mobile USA, Inc.*, No. 2:17-CV-0577-JRG, 2018 WL 4175934, at *1, 9 (E.D. Tex. June 29, 2018)). SIT is a Texas LLC based in Texas,³ and Google is a Delaware LLC based in California. Dkt. 1 ¶¶ 1, 2. Even though SIT is a small company, there is substantial localized interest of SIT choosing to protect its property in its home forum. *AGIS Software Dev. LLC v. Apple, Inc.*, No. 2:17-CV-00516-JRG, 2018 WL 2721826, at *8 (E.D. Tex. June 6, 2018) (“[C]orporation[s] ... are equal before the law and must be treated as equals in a court of justice.”).

Google’s business practices are *not* localized interests because Google markets and sells the Accused Products throughout the entire United States. *See Wireless Recognition Techs. LLC v. A9.com, Inc.*, No. 2:10-CV-364-JRG, 2012 WL 506669, at *6 (E.D. Tex. Feb. 15, 2012) (“Interests that could apply virtually to any judicial district or division in the United States, such as the nationwide sale of infringing products, are disregarded in favor of particularized local interests.”) (quotations omitted). Moreover, in addition to Google’s acts of infringement in the District, Google maintains a significant presence in Texas and this District. *See Ex. I, Our Offices.*

This factor is neutral and therefore does not support transfer.

G. “Court Familiarity” and “Conflicts of Law” Factors Do Not Favor Transfer.

As Google concedes, these two factors do not support transfer. Dkt. 14 at 13.

IV. CONCLUSION

Because Google fails to meet its burden of showing that the Northern District of California is a clearly more convenient forum, the Court should deny Google’s Motion to Transfer Venue.

³ SIT was formed in the District in Austin, Texas where it maintains its registered address. Lucas Dec. ¶ 4. SIT primarily operates out of its location near the District in Frisco, Texas. *Id.*

Dated: May 18, 2021

Respectfully submitted,

/s/ Jeffrey R. Bragalone

Jeffrey R. Bragalone

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Daniel F. Olejko

Texas Bar No. 24108897

Terry A. Saad

Texas Bar No. 24066015

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Attorneys for Plaintiff

SUPER INTERCONNECT

TECHNOLOGIES LLC

CERTIFICATE OF SERVICE

Pursuant to the Federal Rules of Civil Procedure and Local Rule CV-5, I hereby certify that, on May 18, 2021, all counsel of record who have appeared in this case are being served with a copy of the foregoing via the Court's CM/ECF system.

/s/ Jeffrey R. Bragalone
Jeffrey R. Bragalone

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

**SUPER INTERCONNECT
TECHNOLOGIES LLC,**

Plaintiff,

v.

GOOGLE LLC,

Defendant.

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Civil Action No. 6:21-cv-259-ADA

JURY TRIAL DEMANDED

DECLARATION OF JEFFREY R. BRAGALONE

I, Jeffrey R. Bragalone, hereby declare as follows:

1. I am an attorney at the law firm of Bragalone Olejko Saad PC in Dallas, Texas. I am counsel of record for Super Interconnect Technologies LLC (“SIT”) in the above-referenced matter. I am admitted to practice in the State of Texas and the Western District of Texas. I submit this declaration based on personal knowledge and following a reasonable investigation. If called upon as a witness, I could and would competently testify to the truth of each statement herein.

2. I was lead counsel in the case styled *Super Interconnect Technologies LLC v. Google LLC*, No. 2:18-cv-00463, filed in the Eastern District of Texas (the “EDTX Action”). In the EDTX Action, both SIT and Google made all document productions electronically. Non-party Lattice produced documents in response to a subpoena in the EDTX Action and also produced all documents electronically. Indeed, all document productions in the EDTX matter, with the exception of source code discussed in the next paragraph, were made electronically. Each of these electronically-produced documents reside on a secure server at the offices of

Bragalone Olejko Saad PC in Dallas, Texas.

3. Non-party Qualcomm made source code available for inspection in response to a subpoena in the EDTX Action. SIT requested printouts of the source code, which reside in a secure space within the offices of Bragalone Olejko Saad PC in Dallas, Texas.

4. The Northern District of California has four courthouses: San Francisco, Oakland, San Jose, and Eureka. *See About the Court* (available at <https://www.cand.uscourts.gov/>). The southern-most courthouse, and the nearest to San Diego, is the San Jose courthouse. According to Google Maps (<https://www.google.com/maps>), the San Jose courthouse is 460 miles from San Diego, and approximately an eight-hour drive.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on May 18, 2021 in Dallas, Texas

/s/ Jeffrey R. Bragalone
Jeffrey R. Bragalone

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

**SUPER INTERCONNECT
TECHNOLOGIES LLC,**

Plaintiff,

v.

GOOGLE LLC,

Defendant.

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Civil Action No. 6:21-cv-259-ADA

JURY TRIAL DEMANDED

DECLARATION OF HOLLY HERNANDEZ

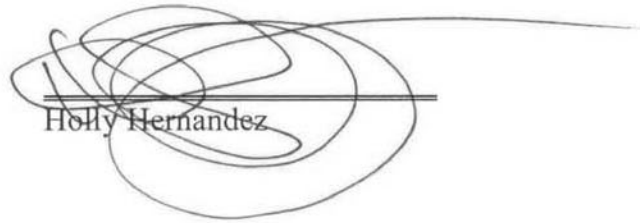
I, Holly Hernandez, hereby declare as follows:

1. I submit this declaration based on personal knowledge. If called upon as a witness, I could and would competently testify to the truth of each statement herein.
2. From 2012 to February 2020, I was the Senior Vice President at Acacia Research Group LLC (“AR Group”).
3. From approximately 2014 to February 2020, I was a Director and Senior Vice President for SIT.
4. Currently, I am not an employee of either AR Group or SIT. I do not hold any positions at AR Group or SIT. I currently provide consulting services for SIT.
5. I currently reside in Frisco, Texas.
6. SIT’s place of business is currently in Frisco, Texas. I primarily perform consulting work on behalf of SIT at this location.
7. I was deposed in this matter and expect to willingly provide testimony at trial.
8. As I live near the Court, I could travel to Waco, Texas to provide testimony

without the need of securing a flight or overnight lodging accommodations. Traveling to the Northern District of California to provide testimony would be far less convenient and far more expensive. Testifying in California would require securing round trip airfare and at least two nights lodging, along with the additional expenses required by such lengthy travel.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on May 11, 2021 in Frisco, Texas



Holly Hernandez

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

**SUPER INTERCONNECT
TECHNOLOGIES LLC,**

Plaintiff,

v.

GOOGLE LLC,

Defendant.

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Civil Action No. 6:21-cv-259-ADA

JURY TRIAL DEMANDED

DECLARATION OF MARC BOOTH

I, Marc Booth, hereby declare as follows:

1. I submit this declaration based on personal knowledge. If called upon as a witness, I could and would competently testify to the truth of each statement herein.
2. I am the Chief Executive Officer of SIT.
3. My work address is 4 Park Plaza, Suite 550, Irvine, California.
4. I was deposed in this matter. I expect to attend trial and willingly provide testimony.
5. Travel to Waco, Texas to provide testimony would be convenient. I regularly travel to Texas and have during the COVID-19 pandemic. While traveling to Waco, Texas would require roundtrip airfare and overnight lodging each night of the trial, holding trial in the Northern District of California would likewise require these same inconveniences.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on May 17, 2021 in Irvine, California



Marc Booth

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

**SUPER INTERCONNECT
TECHNOLOGIES LLC,**

Plaintiff,

v.

GOOGLE LLC,

Defendant.

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Civil Action No. 6:21-cv-259-ADA

JURY TRIAL DEMANDED

DECLARATION OF ERIC LUCAS

I, Eric Lucas, hereby declare as follows:

1. I submit this declaration based on personal knowledge. If called upon as a witness, I could and would competently testify to the truth of each statement herein.
2. I am the President of SIT.
3. My work address is 4 Park Plaza, Suite 550, Irvine, California.
4. SIT is a Texas limited liability company. SIT's initial principal place of business upon formation and current registered address is 1701 Directors Blvd, Suite 300, Austin, TX 78744. Currently, SIT primarily operates out of its location in Frisco, Texas.
5. I was deposed in this matter. I expect to attend trial and willingly provide testimony.
6. Travel to Waco, Texas to provide testimony would be convenient. I regularly travel to Texas and have during the COVID-19 pandemic. While traveling to Waco, Texas would require roundtrip airfare and overnight lodging each night of the trial, holding trial in the Northern District of California would likewise require these same inconveniences.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on May 17, 2021 in Irvine, California

A handwritten signature in black ink, appearing to be 'EL', written over a horizontal line.

Eric Lucas

EXHIBIT A

Notice Regarding General Orders, Court Operations, Santa Rita Jail, and Paper Filings During COVID-19 Public Health Emergency (Updated December 15, 2020)

In light of the continuing COVID-19 public health emergency, access to all Northern District of California courthouses (San Francisco, Oakland, San Jose, and Eureka-McKinleyville) remains temporarily restricted to the public until further notice. See General Order 73. This period may be extended by further order.

Please refer to the following General Orders:

GO 72-6: IN RE: Coronavirus Disease Public Health Emergency (adopted 9/16/2020)

GO 73: Continuing Temporary Restrictions on Courthouse Access (amended 5/21/2020)

GO 74: Temporary Use of Teleconferencing in Criminal Matters Pursuant to CARES ACT (amended 12/15/2020)

GO 75: Temporary Suspension of Rules Regarding Personal Service by USMS (adopted 3/30/2020)

The court will continue accepting electronic filings through ECF. **All local rules requiring that a courtesy copy be provided to the chambers of the assigned judge are suspended pending further notice, unless a judge orders otherwise in a specific case.** See General Order 72-6. For pro se or other documents that have traditionally been filed in paper format, please first contact the phone numbers below to learn of alternative options for filing. If needed, paper filings may be submitted by US Mail or private carrier, and a drop box is available for manual filing at the San Francisco, Oakland, and San Jose courthouses. See General Order 73. Mail and drop box filings will be picked up only intermittently. **Please note that for health and safety reasons, submission of paper filings (through US Mail, private carriers, or in person via drop box), is strongly discouraged.** Emergency filings should not be submitted by mail or drop box.

Questions may be directed to the following phone numbers: **San Francisco Courthouse: (415) 522-2000; Oakland Courthouse: (510) 637-3530; San Jose Courthouse: (408) 535-5363; or McKinleyville Courthouse: (707) 445-3612.**

Questions about under-seal criminal filings, payments, or deliveries should be directed to (415) 522-2000. Questions may also be emailed to ECFHELPDESK@cand.uscourts.gov, or for media inquiries, to media@cand.uscourts.gov.

5/10/2021

Notice Regarding General Orders, Court Operations, Santa Rita Jail, and Paper Filings During COVID-19 Public Health Emergency (Upd...

For updated information on Santa Rita Jail, please visit
[alamedacountysheriff.org/admin_covid19.php](https://www.alamedacountysheriff.org/admin_covid19.php).

EXHIBIT B

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA

GENERAL ORDER No. 74

Temporary Use of Teleconferencing, Videoconferencing, and Other Procedures in Criminal Matters Pursuant to the Coronavirus Aid, Relief, and Economic Security Act ("CARES ACT")
(Reauthorized March 15, 2021)

WHEREAS, on March 13, 2020, the President of the United States declared that the Coronavirus Disease 2019 ("COVID-19") outbreak constitutes a national emergency under the National Emergencies Act, 50 U.S.C. §§ 1601 et seq.; and

WHEREAS, on March 27, 2020, the President signed into law the Coronavirus Aid, Relief, and Economic Security Act ("CARES Act"), which provides that, subject to certain requirements, video teleconferencing and telephone conferencing may be used in enumerated criminal proceedings in certain circumstances during the national emergency related to COVID-19 and thirty (30) days thereafter; and

WHEREAS, the Judicial Conference of the United States has found that emergency conditions due to the national emergency declared by the President with respect to COVID-19 materially affect the functioning of all federal courts; and

WHEREAS, the current public health crisis has caused, is causing, and is expected to continue to cause extraordinary disruption throughout this District, including but not limited to: the temporary closure of offices; the imposition of travel restrictions and discouragement of the use of mass transportation; the dislocation of many residents; disruptions and delays in the use of the mails; reduction of court staff scheduled to work in-person at each courthouse due to the physical distancing recommendations of public health officials; and impact on the availability of parties, attorneys, witnesses and court staff to appear in court due to contact-tracing and self-isolation measures upon exposure to COVID-19; and

WHEREAS, the health crisis in general – and safety protocols and limitations affecting Santa Rita Jail, courthouse facilities, and U.S. Marshals Service transport in particular – continue to restrict transportation of in-custody defendants and severely limit defense counsel's ability to meet with detained clients;

IT IS ORDERED THAT, on motion of the undersigned, the use of video teleconferencing, or telephone conferencing if video teleconferencing is not reasonably available, is authorized for the following proceedings with the consent of the defendant, after consultation with counsel:

- Detention hearings under section 3142 of title 18, United States Code;

- Initial appearances under Rule 5 of the Federal Rules of Criminal Procedure;
- Preliminary hearings under Rule 5.1 of the Federal Rules of Criminal Procedure;
- Waivers of indictment under Rule 7(b) of the Federal Rules of Criminal Procedure;
- Arraignments under Rule 10 of the Federal Rules of Criminal Procedure;
- Probation and supervised release revocation proceedings under Rule 32.1 of the Federal Rules of Criminal Procedure;
- Pretrial release revocation proceedings under section 3148 of title 18, United States Code;
- Appearances under Rule 40 of the Federal Rules of Criminal Procedure;
- Misdemeanor pleas and sentencings as described in Rule 43(b)(2) of the Federal Rules of Criminal Procedure;
- Proceedings under chapter 403 of title 18, United States Code (commonly known as the “Federal Juvenile Delinquency Act”), except for contested transfer hearings and juvenile delinquency adjudication or trial proceedings; and

IT IS FURTHER ORDERED THAT the undersigned specifically finds that felony pleas under Rule 11 of the Federal Rules of Criminal Procedure; felony sentencings under Rule 32 of the Federal Rules of Criminal Procedure; and equivalent plea and sentencing, or disposition, proceedings under chapter 403 of title 18, United States Code (commonly known as the “Federal Juvenile Delinquency Act”) cannot all be conducted in person without seriously jeopardizing public health and safety; and

IT IS FURTHER ORDERED that, because the CARES Act does not require the consent of a defendant to be in writing, such consent may be obtained in the form most practicable under the circumstances, so long as the defendant's consent is clearly reflected in the record; and

IT IS FURTHER ORDERED that, for instances in which the Federal Rules of Criminal Procedure explicitly require the consent of a defendant to be in writing (such as, for example, Rule 32(e), which requires the written consent of the defendant before a pre-plea presentence report is disclosed), if obtaining an actual signature is impractical given the health and safety concerns presented: (i) a defendant may sign a document electronically; or (ii) defense counsel or the presiding judge may sign on the defendant’s behalf if the defendant, after an opportunity to consult with counsel, consents; and

IT IS FURTHER ORDERED THAT, because of the limited availability of videoconferencing for federal defendants at the Santa Rita Jail, videoconferencing may not be reasonably available, meaning that proceedings may occur with the defendant appearing by telephone, to the extent that the defendant has not lawfully waived his participation in the hearing altogether; and

IT IS FURTHER ORDERED THAT this order shall, unless otherwise specified, remain in place for at least ninety days, pending review and reauthorization before that period expires.

ADOPTED: March 30, 2020

FOR THE COURT:

AMENDED: June 24, 2020
September 16, 2020
December 15, 2020
March 15, 2021



RICHARD SEEBORG
CHIEF JUDGE

EXHIBIT C

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

SUPER INTERCONNECT
TECHNOLOGIES LLC,

Plaintiff,

V.

HUAWEI DEVICE CO. LTD., HUAWEI
DEVICE (HONG KONG) CO., LTD, AND
HUAWEI DEVICE USA, INC.,

GOOGLE LLC,

Defendants.

[illegible]

**CIVIL ACTION NO. 2:18-CV-00462-JRG
(LEAD CASE)**

**CIVIL ACTION NO. 2:18-cv-00463-JRG
(MEMBER CASE)**

JOINT MOTION FOR SUPPLEMENTAL PROTECTIVE ORDERS

Plaintiff Super Interconnect Technologies LLC (“Plaintiff”) and Defendant Google LLC (“Defendant”) (collectively, the “Parties”) submit this joint motion for entry of supplemental protective orders to supersede the Court’s Protective Order (Dkt. No. 39), First Amended Protective Order (Dkt. No. 45), and Supplemental Protective Order (Dkt. No. 66) to allow the parties to maintain and use DESIGNATED MATERIAL in a pending suit between the Parties in *Super Interconnect Technologies LLC v. Google LLC*, C.A. No. 6:21-cv-00259-ADA, currently pending in the Western District of Texas (the “WDTX matter”).

On November 2, 2018, Plaintiff filed a complaint against Defendant asserting patent infringement of U.S. Patent Nos. 7,627,044, 6,463,092, and 7,158,593 (Member Case No. 2:18-CV-00463, Dkt. No. 1). The Parties conducted fact discovery regarding Plaintiff's infringement contentions, and fact discovery closed December 26, 2019 (Dkt. No. 95). After the close of fact discovery, a Federal Circuit panel concluded that venue in this District is improper for this matter

and directed the Court to dismiss or transfer the case as appropriate under 28 U.S.C. § 1406(a). *In re Google LLC*, 949 F.3d 1338, 1347 (Fed. Cir. 2020). The Court thereafter dismissed this case (Dkt. No. 111), triggering the Protective Orders’ requirements to return or destroy DESIGNATED MATERIAL and Designated Qualcomm Material produced in this matter.

On March 15, 2021, Plaintiff filed a complaint against Defendant, asserting infringement of the same patents at issue in this case. *See* WDTX Complaint, Ex. A. As the allegations and factual issues of this matter and the WDTX matter substantially overlap, the Parties seek to use DESIGNATED MATERIAL and Designated Qualcomm Material obtained through discovery in this matter in the WDTX matter, in an effort to reduce unnecessary burdens to the Parties and the court in the WDTX matter. As such, the Parties jointly seek supplemental protective orders to supersede the Court’s current Protective Orders and allow the Parties to maintain and use DESIGNATED MATERIAL and Designated Qualcomm Material in the WDTX matter. Non-party Qualcomm does not oppose this motion.

I. The Court’s Protective Order (Dkt. No. 39) and First Amended Protective Order (Dkt. No. 45).

The Court entered a Stipulated Protective Order on April 8, 2019. (Dkt. 39). On July 16, 2019, Defendant Google filed an unopposed motion to amend the Protective Order to add a paragraph (paragraph 38) to clarify limitations on the cross-use and disclosure of confidential information. (Dkt. No. 44). Other than the addition of paragraph 38, the motion did not affect any other portion of the protective order. *Id.* The Court granted the motion and entered the First Amended Protective Order on July 17, 2019. (Dkt. No. 45).

The Parties request to modify the First Amended Protective Order in three respects, each reflected in the proposed Second Amended Protective Order, attached hereto as Exhibit B. First, the Parties request to modify the definition of “Action” in footnote 3 to include the WDTX matter,

as shown on page four, footnote 3 of Exhibit B . Second, the Parties request to modify the protective order to make explicit that the Second Amended Protective Order supersedes the Court's Protective Order (Dkt. No. 39) and First Amended Protective Order (Dkt. No. 45), as shown on page 2 of Exhibit B. Lastly, the Parties stipulate that they will move the court in the WDTX matter to enter a protective order substantially similar to the Court's First Amended Protective Order. When the court in the WDTX matter enters a protective order, the Parties request that the WDTX court's protective order supersede the Second Amended Protective Order in this matter, as shown on page 2 of Exhibit B. The Parties do not seek to amend the First Amended Protective Order in any other respects.

II. The Court's Protective Order Regarding Non-Party Qualcomm (Dkt. No. 66).

The Court entered a Supplemental Protective Order Between Non-Party Qualcomm Incorporated, Plaintiff, and Defendants (Dkt. No. 66) (the “Qualcomm PO”) on October 21, 2019. The Parties request to modify the Qualcomm PO in three respects, each reflected in the proposed First Amended Supplemental Protective Order, attached hereto as Exhibit C. First, the Parties request to define the term “action” to include the WDTX matter, as shown in paragraph 16 of Ex. C. Second, the parties the Parties request to modify the Qualcomm PO to make explicit that the First Amended Qualcomm PO (Ex. C) supersedes the Qualcomm PO, as shown on page 2 of Ex. C. Lastly, the Parties stipulate that they will move the court in the WDTX matter to enter a protective order substantially similar to the Court’s Qualcomm PO (Dkt. No. 66). When the court in the WDTX matter enters a protective order, the Parties request that the WDTX court’s protective order supersede the Qualcomm PO, as shown in paragraph one of Ex. C.

III. Conclusion

For the foregoing reason, the Parties jointly move the Court to enter the Second Amended Protective Order, attached as Exhibit B, and the First Amended Supplemental Protective Order Between Non-Party Qualcomm Incorporated, Plaintiff, and Defendant, attached as Exhibit C.

Date: April 30, 2021

Respectfully submitted,

<p><u>/s/ Terry A. Saad</u> Jeffrey R. Bragalone Texas Bar No. 02855775 Terry A. Saad Texas Bar No. 24066015 Daniel F. Olejko Texas Bar No. 24108897 Jerry D. Tice II Texas Bar No. 24093263</p> <p>BRAGALONE OLEJKO SAAD PC 2200 Ross Avenue Suite 4500W Dallas, TX 75201 Tel: (214) 785-6670 Fax: (214) 785-6680 jbragalone@bosfirm.com tsaad@bosfirm.com dolejko@bosfirm.com jtice@bosfirm.com</p> <p>Wesley Hill State Bar No. 24032294 Ward, Smith & Hill, PLLC PO Box 1231 Longview, Texas 75606-1231 (903) 757-6400 (telephone) (903) 757-2323 (facsimile) wh@wsfirm.com</p> <p><i>Attorneys for Plaintiff</i> SUPER INTERCONNECT TECHNOLOGIES LLC</p>	<p>By <u>/s/ Mark Mann (with permission)</u> J. Mark Mann State Bar No. 12926150 G. Blake Thompson State Bar No. 24042033 MANN TINDEL THOMPSON 300 West Main Street Henderson, Texas 75652 (903) 657-8540 (903) 657-6003 (fax)</p> <p>Darin W. Snyder (<i>Pro Hac Vice</i>) dsnyder@omm.com Luann L. Simmons (<i>Pro Hac Vice</i>) lsimmons@omm.com David S. Almeling (<i>Pro Hac Vice</i>) dalmeling@omm.com Mark Liang (<i>Pro Hac Vice</i>) mliang@omm.com O'MELVENY & MYERS LLP Two Embarcadero Center, 28th Floor San Francisco, California 94111-3823 Tel: (415) 984-8700 Fax: (415) 984-8701</p> <p><i>Attorneys for Defendant Google LLC</i></p>
---	--

CERTIFICATE OF CONFERENCE

Pursuant to Local Rule CV-7(h), (i), I certify that counsel for Plaintiff conferred with counsel for Defendant via telephonic conference and email exchanges and, as reflected in the body of the Motion, the Parties agree to the form and substance of the Motion, the Motion is unopposed, and the parties jointly submit it to the Court. Counsel for Plaintiff and Defendant conferred with counsel for non-party Qualcomm. Qualcomm does not oppose this motion.

/s/ Terry A. Saad
Terry A. Saad

CERTIFICATE OF SERVICE

The undersigned hereby certifies that counsel of record who are deemed to have consented to electronic service are being served with a copy of this document via the Court's CM/ECF system per Local Rule CV-5(a)(3).

/s/ Terry A. Saad
Terry A. Saad

EXHIBIT D

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

SUPER INTERCONNECT
TECHNOLOGIES LLC,
Plaintiff,

v.

HUAWEI DEVICE CO. LTD.,
ET AL

GOOGLE LLC,
Defendants.

)

)

)

)

)

)

) Civil Action No.
) 2:18-cv-00462-JRG

)

)

) Civil Action No.
) 2:18-cv-00463-JRG

ORAL AND VIDEOTAPED DEPOSITION OF
HOLLY HERNANDEZ

AS 30(b)(6) FOR SUPER INTERCONNECT TECHNOLOGIES LLC
DECEMBER 19, 2019

1 ORAL AND VIDEOTAPED DEPOSITION OF HOLLY HERNANDEZ,
2 produced as a witness at the instance of the Defendant
3 Google LLC, and duly sworn, was taken in the
4 above-styled and numbered cause on the 19th day of
5 December, 2019, from 8:59 a.m. to 11:57 a.m., before
6 Julie C. Brandt, RMR, CRR, and CSR in and for the State
7 of Texas, reported by machine shorthand, at the offices
8 of Bragalone Conroy PC, 2200 Ross Avenue, Suite 4500 W,
9 Dallas, Texas, pursuant to the Federal Rules of Civil
10 Procedure and the provisions stated on the record or
11 attached hereto.

A P P E A R A N C E S

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VIDEOGRAPHER:

Norm Harris - Veritext Legal Solutions

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1 P R O C E E D I N G S 08:55:50

2 THE VIDEOGRAPHER: We are going on the 08:55:50

3 record at 8:59 a.m. My name is Norm Harris representing 08:58:35

4 Veritext. The date today is December the 19th, 2019. 08:58:41

5 This deposition is being held at Bragalone Conroy PC in 08:58:45

6 Dallas, Texas, and is being taken by counsel for the 08:58:49

7 Defendant. 08:58:52

8 The caption of the case is Super Interconnect 08:58:54

9 Technologies LLC versus Huawei Device Company Limited, 08:58:58

10 et al. and Google LLC. This case is being filed in the 08:59:05

11 US District Court for the Eastern District of Texas, 08:59:11

12 Marshall Division, Case No. 2:18-cv-00463-JRG. 08:59:16

13 The name of the witness is Holly Hernandez. 08:59:28

14 Attorneys, please state your appearance. 08:59:32

15 MR. LIANG: Mark Liang from the law firm 08:59:34

16 of O'Melveny & Myers LLP representing Defendant Google 08:59:37

17 LLC. 08:59:42

18 MR. KIMBLE: Justin Kimble for the 08:59:42

19 Witness and the Plaintiff. 08:59:44

20 MR. LIANG: So counsel has agreed to a 08:59:48

21 pair of stipulations. 08:59:50

22 MR. KIMBLE: Hold on one second. Do we 08:59:51

23 need to --

24 THE REPORTER: I was going to swear her

25 in.

Page 6

1 MR. KIMBLE: Yeah.

2 MR. LIANG: Okay. Do that first.

3 (Witness sworn.) 09:00:03

4 MR. LIANG: So before beginning, counsel 09:00:03

5 for the parties agree to a pair of stipulations. I will 09:00:05

6 state the first one, at least. 09:00:08

7 So we stipulated that Ms. Hernandez will be 09:00:10

8 here to testify on Google's 30(b)(6) notice topics 1, 2, 09:00:13

9 5, 33, 34, 35 and finally 36 to the extent it applies to 09:00:22

10 the other topics for which we designated her or, rather, 09:00:30

11 for which she was designated. Subject to SIT's 09:00:33

12 objections. 09:00:37

13 MR. KIMBLE: That's correct. 09:00:37

14 MR. LIANG: Do you want to state your 09:00:42

15 stipulation or do you want me to state it? 09:00:43

16 MR. KIMBLE: Oh. I believe -- so I 09:00:45

17 believe that, as in earlier depositions, counsel have 09:00:48

18 agreed that they can have a running objection to 09:00:52

19 questions that go beyond the scope of the topics for 09:01:00

20 which the witness has been designated. 09:01:03

21 MR. LIANG: Okay. And we agree to that 09:01:07

22 for Google. 09:01:08

23 Let's begin. 09:01:10

24 HOLLY HERNANDEZ, 09:01:10

25 having been first duly sworn, testified as follows: 09:01:11

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1	EXAMINATION	09:01:11
2	BY MR. LIANG:	09:01:12
3	Q. Will you please state your full name for the	09:01:12
4	record?	09:01:14
5	A. Holly Jennifer Hernandez.	09:01:14
6	Q. Can you please state your work address?	09:01:16
7	A. Sorry, I drew a blank there for a second.	09:01:18
8	6136 Frisco Square Boulevard, Suite 400,	09:01:24
9	Frisco, Texas, 75034.	09:01:28
10	Q. Is that address for a particular employer?	09:01:30
11	A. Yes.	09:01:35
12	Q. Who is that employer?	09:01:36
13	A. Acacia Research Group.	09:01:37
14	Q. Is that address for any other employer?	09:01:39
15	A. That address is also for -- that's my only	09:01:41
16	employer, correct.	09:01:44
17	Q. I see. Okay. And you understand you're under	09:01:45
18	oath today?	09:01:50
19	A. Yes.	09:01:50
20	Q. Have you been deposed before?	09:01:50
21	A. Yes.	09:01:51
22	Q. How many times?	09:01:52
23	A. Approximately 50.	09:01:52
24	Q. What was the subject matter of your prior	09:01:55
25	depositions?	09:02:01

Page 8

1 A. They're all related to cases that Acacia's 09:02:04
2 subsidiaries are involved in. 09:02:12
3 Q. And usually what type of topics are you 09:02:13
4 designated about? For example, today you're designated 09:02:16
5 on several topics. Are you usually covering similar 09:02:18
6 topics, or does it vary quite a bit? 09:02:20
7 A. It's usually similar topics. 09:02:22
8 Q. And they were all generally patent 09:02:23
9 infringement cases? 09:02:25
10 A. Yes, for the most part. 09:02:26
11 Q. Have you ever been deposed on behalf of Super 09:02:28
12 Interconnect? 09:02:32
13 A. I don't believe so. 09:02:32
14 Q. But you've been deposed on behalf of many 09:02:33
15 other Acacia entities. Correct? 09:02:38
16 A. Correct. 09:02:39
17 Q. Have you ever been deposed on behalf of Acacia 09:02:40
18 itself? 09:02:43
19 A. I may have. 09:02:44
20 Q. Have you ever testified at trial before? 09:02:47
21 A. Yes. 09:02:49
22 Q. How many times? 09:02:51
23 A. A few. 09:02:52
24 Q. Is that five, ten? 09:02:57
25 A. Probably less than three. 09:02:59

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1 Q. What was generally the subject matter of your 09:03:00
2 prior testimony? 09:03:03
3 A. Same. 09:03:04
4 Q. Same as? 09:03:06
5 A. Patent infringement cases. 09:03:07
6 Q. So I suppose, given your experience, you don't 09:03:09
7 need any instructions today for -- preliminary 09:03:13
8 instructions on how this deposition will go then? 09:03:17
9 A. No, I think I'm fine. Thank you. 09:03:19
10 Q. Okay. So I'll introduce first your deposition 09:03:20
11 notice or 30(b)(6) deposition notice, as well as the 09:03:28
12 30(b)(1) deposition notice. So this will be Exhibit No. 09:03:30
13 SIT 1. It's Google's Rule 30(b)(6) Notice Deposition of 09:03:34
14 Super Interconnect Technologies LLC. 09:03:40
15 (Exhibit 1 marked.) 09:03:43
16 Q. (BY MR. LIANG) Have you seen this document 09:03:56
17 before? 09:03:56
18 A. Yes. 09:03:57
19 Q. In what context? 09:03:59
20 A. In preparing for today's deposition. 09:04:01
21 Q. And you understand, as I stated at the 09:04:04
22 beginning on the stipulations, the topics you're 09:04:08
23 designated for, in particular, 1, 2, 5, 33, 34, 35 and 09:04:10
24 36? 09:04:16
25 A. Yes. 09:04:17

1 Q. And are you prepared to testify about each of 09:04:17
2 these topics? 09:04:24
3 A. Yes. 09:04:25
4 Q. And just to summarize what the topics are 09:04:25
5 about, you're prepared to testify today about SIT's 09:04:28
6 corporate structure, its business model, the services 09:04:32
7 they provide? 09:04:35
8 A. Yes. 09:04:36
9 Q. You're prepared to testify about any products 09:04:36
10 or services offered, sold by SIT as well as the prior 09:04:42
11 assignees of the patents? 09:04:46
12 A. Yes. 09:04:48
13 Q. And you're prepared to testify about SIT's 09:04:49
14 efforts to comply with the marketing requirement as to 09:04:52
15 the asserted patents, including for itself, as well as 09:04:54
16 its licensees? 09:04:58
17 A. Yes. 09:05:00
18 Q. Any reason why you're not prepared for any of 09:05:01
19 these topics? 09:05:04
20 A. No. 09:05:05
21 Q. I would like to introduce one more exhibit 09:05:05
22 here. This will be SIT Exhibit 1 -- 2, rather. The 09:05:15
23 Google's Notice of Deposition of Holly Hernandez under 09:05:23
24 Rule 30(b)(1). 09:05:27
25 (Exhibit 2 marked.) 09:05:36

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EXHIBIT E

IN THE UNITED STATES DISTRICT COURT
FOR THE CENTRAL DISTRICT OF CALIFORNIA

)
)
SUPER INTERCONNECT TECHNOLOGIES,)
LLC,)

Plaintiff,)

v.)
_____)

) Civil Action No.
) 2:18-cv-00462-JRG
HUAWEI DEVICE CO. LTD., et al.,) LEAD CASE
_____)

GOOGLE LLC,)

Defendant.)

VIDEO DEPOSITION OF ERIC LUCAS
Newport Beach, California
Friday, December 20, 2019
Volume I

Reported by:

Gail E. Kennamer, CSR 4583, CCRR

Job No. 3804813

Pages 1 - 207

Page 1

IN THE UNITED STATES DISTRICT COURT
FOR THE CENTRAL DISTRICT OF CALIFORNIA

SUPER INTERCONNECT TECHNOLOGIES,)
LLC,)

Plaintiff,)

v.)

HUAWEI DEVICE CO. LTD., et al.,) Civil Action No.
2:18-cv-00462-JRG

LEAD CASE

GOOGLE LLC,) Civil Action No.
2:18-cv-00463-JRG

Defendant.)

Video Deposition of Eric Lucas, Volume I, taken
on behalf of Defendant Google, LLC at 660 Newport Center
Drive, Suite 1600, Newport Beach, California; beginning at
9:19 a.m. and ending at 4:02 p.m.; Friday, December 20,
2019, before Gail E. Kennamer, CSR 4583, CCRR.

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15 O'MELVENY & MYERS LLP

16 BY: MARK LIANG, ESQ.

17 and ERIC SU, ESQ.

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19 San Francisco, California 94111-3823

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22
23
24 Also Present:

25 Jennifer Williams, Videographer

Page 3

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WITNESS

EXAMINATION

ERIC LUCAS

Volume I

BY MR. LIANG 11, 178, 198, 202

BY MR. BRAGALONE 170, 195, 200

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4		Fed.R.Civ.P 30(b)(6)	
5		Deposition of Super Interconnect	
6		Technologies, Inc.	
7			
8	Exhibit 3	United States Patent	48
9		6,463,092 B1	
10			
11	Exhibit 4	United States Patent	49
12		7,158,593 B2	
13			
14	Exhibit 5	United States Patent	49
15		7,627,044 B2	
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19		Fiscal Year December 31, 2018	
20			
21	Exhibit 8	Confidential License	81
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23		Bates SI_TECH-000732 to	
24		SI_TECH-000812	
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Exhibit 16	Settlement, Covenant, and Related Rights Agreement Bates SI_TECH-007526 to SI_TECH-007562	142
Exhibit 17	Google LLC's Notice of Deposition of Eric Lucas	14
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Exhibit 21	Assignment Bates SI_TECH-000667 to SI_TECH-000670	74
Exhibit 22	Second Amendment to Agreement Bates SI_TECH-000674 to SI_TECH-000687	77
Exhibit 23	License and Covenant Not-to-Sue Agreement Bates SI_TECH-007962 to SI_TECH-008007	120
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EXHIBITS

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Exhibit 25	Settlement and Patent License Agreement Bates SI_TECH-008091 to SI_TECH-008120	136
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Newport Beach, California; Friday, December 23, 2019

9:19 a.m.

VIDEO OPERATOR: Good morning. We are on the
record at 9:19 a.m. on December 20th, 2019. Please note 09:19
that microphones are sensitive and may pick up whispers,
private conversations, and cellular interference. Please
turn off all cell phones or place them away from the
microphones as they can interfere with the deposition
audio. Audio and video recording will take place unless 09:20
all parties agree to go off the record.

This is Media 1 of the video-recorded deposition of
Eric Lucas, taken by counsel for defendant in the matter
of Super Interconnect Technologies, LLC versus Huawei
Device Company Limited, et al. and Super Interconnect 09:20
Technologies, LLC versus Google, filed in the U.S.
District Court for the eastern District of Texas. Case
Numbers 2:18-cv-00462-JRG and 2:18-cv-00463-JRG.

This deposition is being held at Stradling Yocca,
located at 660 Newport Center Drive, Suite 1600, in 09:20
Newport Beach.

My name is Jennifer Williams from Veritext. I'm the
videographer. The court reporter is Gail Kennamer from
Veritext. I am not related to any party in this action,
nor am I financially interested in the outcome. 09:21

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1 Counsel will now state their appearances and 09:21
2 affiliations for the record.

3 MR. LIANG: Mark Liang of the law firm
4 O'Melveny & Myers on behalf of defendant, Google, LLC.

5 With me today, also from O'Melveny, for Google is 09:21
6 Eric Su.

7 MR. BRAGALONE: Jeff Bragalone, Bragalone
8 Conroy. I represent the plaintiffs, Super Interconnect
9 Technologies, LLC and also the witness, Mr. Lucas.

10 VIDEO OPERATOR: Thank you. 09:21

11 Will the court reporter please swear in the witness.
12

13 ERIC LUCAS,
14 a witness herein, having been administered an oath, was
15 examined, and testified as follows:
16
17

18 MR. LIANG: So before beginning, I'd like to
19 make a stipulation regarding the topics for which Mr. Eric
20 Lucas has been designated by plaintiff. 09:22

21 The 30(b)(6) topics, they are: Topic Numbers 7, 8,
22 12, 13, 14, 24, 25, 26, 27, 28, 31; and finally, 36 to the
23 extent it applies to the other topics I just identified.

24 So these topics were identified in Google's Rule
25 30(b)(6) Notice to Super Interconnect, and they are also 09:22

Page 10

1 subject to any objections and responses from Super 09:22
2 Interconnect.
3 Can we agree to that, counsel for plaintiff?
4 MR. BRAGALONE: Yes.
5 Just a moment. Let me just. You said 36? 09:22
6 MR. LIANG: To the extent it applies to the
7 other topics, it's --
8 MR. BRAGALONE: Yeah, that's fine.
9
10 -EXAMINATION- 09:23
11
12 BY MR. LIANG:
13 Q. With that, we'll start.
14 Can you please state your full name for the record,
15 please. 09:23
16 A. Eric Stephen Lucas.
17 Q. Please state your work address.
18 A. 4 Park Plaza, Irvine, California.
19 Q. And what employer is that, at that address?
20 A. Acacia Research Group. 09:23
21 Q. Any other companies located there that you're
22 affiliated with?
23 A. No.
24 Q. Have you been deposed before?
25 A. Yes. 09:23

Page 11

1 Q. How many times, approximately? 09:23
2 A. Ten.
3 Q. And what was the subject matter of those prior
4 depositions?
5 A. Many times. I was a 30(b)(6) witness like I am 09:23
6 today.
7 Q. So the topics were similar to those at issue
8 today that you understand you're being designated for?
9 A. Fairly similar, yes.
10 Q. Were they all patent infringement cases? 09:24
11 A. Yes, I believe so.
12 Q. In those other cases, who were you testifying on
13 behalf?
14 A. They were various subsidiaries of Acacia
15 Research Group. 09:24
16 Q. Have you ever testified on behalf of SIT or --
17 I'll call them SIT the rest of this deposition -- have you
18 ever been deposed on behalf of SIT before?
19 A. I don't believe so, no.
20 Q. Have you testified at a trial before? 09:24
21 A. No.
22 Q. Is there any reason you cannot give truthful and
23 accurate testimony today?
24 A. No.
25 Q. So I'll enter in -- As background, we did a 09:24

1 deposition of one of your colleagues, Holly Hernandez, 09:24
2 yesterday. So we're going to use an exhibit numbering
3 system of SIT filed by the number, and we're going to
4 reuse some numbers from yesterday, so that will explain
5 some of the numbering -- 09:25

6 A. Okay.

7 Q. -- identification we have to make.

8 This was already entered in as SIT Exhibit 1. It's
9 the -- We will remark it, so we're clear in this
10 deposition. 09:25

11 (Deposition Exhibit 1 was marked for identification
12 by the court reporter.)

13 BY MR. LIANG:

14 Q. I'll read off what it is. This is Google's
15 Notice of Rule 30(b)(6) Deposition to Plaintiff Super 09:25
16 Interconnect Technologies.

17 Have you seen this document before?

18 A. (Indicating.)

19 I believe so, yes.

20 Q. And in what context did you see this document? 09:25

21 A. I reviewed it in preparation for my deposition.

22 Q. And you understand -- Well, you heard me
23 stipulate to the topics you were designated for; correct?

24 A. Yes.

25 Q. And you're prepared to testify on each and every 09:26

1 one of those topics today; correct? 09:26

2 A. I believe they are the topics. I didn't
3 memorize them, but I think those are the documents I
4 prepared.

5 Q. I will just generalize generally the subject of 09:26
6 those topics.

7 So I have that they relate to assignments and
8 essentially how the patents became owned or assigned to
9 SIT today, License Agreements, financial performance since
10 2012 as well as some issues relating to damages and 09:26
11 priority dates and conception to practice.

12 Does that sound accurate?

13 A. Sounds accurate, yes.

14 Q. Are there any subjects or topics that you don't
15 think you're prepared to testify about today? 09:26

16 A. I don't believe so.

17 MR. LIANG: Next exhibit is -- This will be
18 exhibit -- Where did we leave off with Hernandez? 16;
19 right?

20 MR. SU: Yeah. 09:27

21 MR. LIANG: Okay. This will be SIT Exhibit 17.
22 (Deposition Exhibit 17 was marked for identification
23 by the court reporter.)

24 BY MR. LIANG:

25 Q. This is Google's Notice of Deposition under Rule 09:27

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VERITEXT LEGAL SOLUTIONS
COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

Veritext Legal Solutions is committed to maintaining the confidentiality of client and witness information, in accordance with the regulations promulgated under the Health Insurance Portability and Accountability Act (HIPAA), as amended with respect to protected health information and the Gramm-Leach-Bliley Act, as amended, with respect to Personally Identifiable Information (PII). Physical transcripts and exhibits are managed under strict facility and personnel access controls. Electronic files of documents are stored in encrypted form and are transmitted in an encrypted fashion to authenticated parties who are permitted to access the material. Our data is hosted in a Tier 4 SSAE 16 certified facility.

Veritext Legal Solutions complies with all federal and State regulations with respect to the provision of court reporting services, and maintains its neutrality and independence regardless of relationship or the financial outcome of any litigation. Veritext requires adherence to the foregoing professional and ethical standards from all of its subcontractors in their independent contractor agreements.

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EXHIBIT F

IN THE UNITED STATES DISTRICT COURT
FOR THE CENTRAL DISTRICT OF CALIFORNIA

SUPER INTERCONNECT TECHNOLOGIES,)
LLC,)

Plaintiff,

V.

) Civil Action No.
) 2:18-cv-00462-JRG
) LEAD CASE

HUAWEI DEVICE CO. LTD., et al.,

GOOGLE LLC,

) Civil Action No.
) 2:18-cv-00463-JRG

Defendant.

VIDEO DEPOSITION OF MARC BOOTH
Newport Beach, California
Monday, December 23, 2019
Volume I

Reported by:

Gail E. Kennamer, CSR 4583, CCRR

Job No. 3804815

Page 1

IN THE UNITED STATES DISTRICT COURT
FOR THE CENTRAL DISTRICT OF CALIFORNIA

)
)
SUPER INTERCONNECT TECHNOLOGIES,)
6 LLC,)
)
7 Plaintiff,)
v.)
8 _____)
) Civil Action No.
) 2:18-cv-00462-JRG
HUAWEI DEVICE CO. LTD., et al.,) LEAD CASE
10 _____)
)
11 GOOGLE LLC,) Civil Action No.
) 2:18-cv-00463-JRG
12 Defendant.)

Video Deposition of Marc Booth, Volume I, taken
on behalf of Defendant Google, LLC at 660 Newport Center
Drive, Suite 1600, Newport Beach, California; beginning at
9:15 a.m. and ending at 3:14 p.m.; Monday, December 23,
2019, before Gail E. Kennamer, CSR 4583, CCRR.

1 APPEARANCES:

2
3 For Plaintiff:

4
5 BRAGALONE CONROY PC

6 BY: JEFFREY R. BRAGALONE, ESQ.

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13 For Defendant Google, LLC:

14
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18 San Francisco, California 94111-3823

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20 mliang@omm.com

21
22
23 Also Present:

24 Jennifer Williams, Videographer

25
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WITNESS

EXAMINATION

MARC BOOTH

Volume I

BY MR. LIANG

8

BY MR. BRAGALONE

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Questions the witness is instructed or refuses not to
answer are located on the following pages:

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4

EXHIBITS

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Exhibit 28	Google LLC's Notice of Deposition of Marc Booth	13
Exhibit 29	Agreement Bates Latt-SIT-000507 to Latt-SIT-000510	85
Exhibit 30	Non-Assertion Agreement Bates Latt-SIT-000511 to Latt-SIT-000516	85
Exhibit 31	The MIPI Membership Agreement Bates MIPI000044 to MIPI000064	122
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Exhibit 33	Plaintiff's 5th Amended Responses to Defendant Google LLC's First Set of Interrogatories No. 1-13	168

Newport Beach, California; Monday, December 23, 2019

9:15 a.m.

VIDEO OPERATOR: Good morning. We are on the 09:15
record at 9:15 a.m. on December 23rd, 2019. Please note
that microphones are sensitive and may pick up whispers,
private conversations, and cellular interference. Please
turn off all cell phones or place them away from the
microphones as they can interfere with the deposition 09:16
audio. Audio and video recording will take place unless
all parties agree to go off the record. This is Media 1
of the video-recorded deposition of Marc Booth, taken by
counsel for defendant in the matter of Super Interconnect
Technologies, LLC versus Huawei Device Company Limited, 09:16
et al.; and Super Interconnect Technologies, LLC versus
Google, filed in the U.S. District Court for the Eastern
District of Texas. Case numbers 2:18-cv-00462-JRG and
2:18-cv-00463-JRG. This deposition is being held at
Stradling Yocca, located at 660, Newport Center Drive, 09:17
Suite 1600, in Newport Beach.

My name is Jennifer Williams from Veritext. I'm the
videographer. The court reporter is Gail Kennamer from
Veritext. I am not related to any party in this action,
nor am I financially interested in the outcome. 09:17

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1 Counsel will now state their appearances and 09:17
2 affiliations for the record.

3 MR. LIANG: Mark Liang, representing Google,
4 LLC, the defendant, and I'm also with the law firm of
5 O'Melveny & Myers LLP. 09:17

6 MR. BRAGALONE: Jeff Bragalone; Bragalone
7 Conway, representing the plaintiffs Super Interconnect
8 Technologies, LLC and also today the witness, Mr. Booth.

9 VIDEO OPERATOR: Thank you. Can you put your
10 mic on, please. 09:17

11 Will the court reporter please swear in the witness.

12
13 MARC WILLIAM BOOTH,
14 a witness herein, having been administered an oath, was
15 examined, and testified as follows:

16
17
18 MR. LIANG: Now I would like to have one
19 stipulation on the record before beginning.

20 The stipulation relates to the topics for which Marc 09:18
21 Booth is designated under Federal Rules Civil Procedure
22 30(b)(6) and Google's Deposition Notice under that rule.

23 The topics for which Mr. Booth is designated are: 4,
24 6, 9, 10, 11, 17, 18, 19, 22, 23, 30, and 36 to the extent
25 it applies to Mr. Booth's other topics. 09:18

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1 In the past few days, I suppose, Super Interconnect 09:19
2 has also de-designated Eric Lucas for Topics 12 and 25 and
3 redesignated Mr. Booth for those topics. Sorry. Let me
4 repeat that. They de-designated Eric Lucas for Topics 25
5 and 31 and redesignated Mr. Booth for those topics, and 09:19
6 they also want to designate Mr. Booth for Topic 12, in
7 addition to Eric Lucas; so both witnesses are designated
8 on that topic.

9 Google reserves its objections to those
10 re-designations which were made during or after the 09:19
11 deposition of Mr. Lucas, and all these topic designations
12 are subject to SIT's objections and responses, in response
13 to Google's 30(b)(6) Deposition Notice.

14 MR. BRAGALONE: That is correct.

15 And we also responded by email today regarding your 09:19
16 reservation of objection, and I won't restate that here.

17 But thank you. That is correct.

18 And in addition, we will want to read and sign both
19 for Mr. Lucas' and for Mr. Booth's deposition.

20 09:20

21 -EXAMINATION-

22

23 BY MR. LIANG:

24 Q. Let's begin.

25 Can you please state your full name for the record. 09:20

Page 8

1 A. Marc William Booth. 09:20

2 Q. Can you please state your work address?

3 A. 4 Park Plaza, Suite 550, Irvine, California

4 92614.

5 Q. And what company that you work for is located at 09:20

6 that address?

7 A. Acacia Research Group.

8 Q. Any other companies you work for located at that

9 address?

10 A. Acacia Research Corporation also has a business, 09:20

11 place of business there.

12 Q. Is that office the headquarters for Acacia

13 Research Group?

14 A. Acacia Research Group is actually headquartered

15 in Texas. 09:20

16 Q. And what about Acacia Research Corporation, is

17 that the headquarters?

18 A. It's a Delaware corporation, but that's the main

19 office.

20 Q. So that is the main place of business of Acacia 09:21

21 Research Corporation?

22 A. Yes.

23 Q. As to Acacia Research Group, is that also the

24 main business location?

25 A. Yes. 09:21

1 Q. So you have been the CEO since coming back to 10:19
2 Acacia in August 2018?

3 A. Essentially, yes.

4 Q. How many hours a week would you say you spend
5 working on SIT's specific issues? 10:19

6 A. Depends on what part of the licensing and
7 litigation that the cases are in, but it could be as
8 little as two hours a week, and it could be as much as
9 eight or ten.

10 Q. So let's say over the past year on average, it's 10:19
11 about two to ten hours a week?

12 A. Something like that, yes.

13 Q. Where is SIT's principal office located?

14 A. Its incorporated in Texas; in Plano, Texas --
15 I'm sorry. Dallas, Texas. 10:19

16 Q. Is that also where its main office is located?

17 A. Yes.

18 Q. In Dallas, Texas?

19 MR. BRAGALONE: The witness isn't designated on
20 this particular topic, but from his personal knowledge. 10:20

21 THE WITNESS: Yes. It's actually in Plano,
22 Texas. I was correct the first time.

23 BY MR. LIANG:

24 Q. And you're located in Irvine, California;
25 correct? 10:20

1 A. Correct. 10:20

2 Q. How often have you visited SIT's Plano office?

3 A. I have not visited very often. Recently I was

4 toward the end of my tenure, before 2017, in that last

5 couple years, probably made a trip down there once a 10:20

6 month.

7 Q. Since coming back to Acacia in August 2018,

8 you've never visited SIT's office?

9 A. That's correct.

10 Q. Does that office in Plano, is that also an 10:21

11 office for other Acacia entities and subsidiaries?

12 A. We have -- Yes, there are additional

13 subsidiaries incorporated there.

14 Q. Roughly, how many subsidiaries are incorporated

15 at that office? 10:21

16 A. I don't know. Dozens, probably. There are many

17 of them.

18 Q. Is that office in Plano also an office for

19 Acacia Research Group?

20 A. There is an Acacia Research Group employee 10:21

21 there, yes.

22 Q. Is that Holly Hernandez?

23 A. Correct.

24 Q. That's the only office for -- Strike that.

25 Does SIT have any other offices other than that 10:21

1 office in Plano? 10:21

2 A. Well, the office itself is actually located in
3 Frisco. It was located in Plano prior, and I think they
4 moved prior to me coming back, I believe they are now in
5 Frisco. 10:22

6 Q. So I want to restart a few of the questions,
7 then.

8 So that office in Frisco, that's also the office of
9 Acacia Research Group; correct?

10 A. Correct. 10:22

11 Q. It's also an office through which -- Strike
12 that.

13 It's also an office with the headquarters for dozens
14 of Acacia entities and subsidiaries; correct?

15 A. Correct. 10:22

16 Q. That office has only one employee there, Holly
17 Hernandez?

18 A. Correct.

19 Q. And you have never visited that office in
20 Frisco; correct? 10:22

21 A. Not since they moved from Plano, no.

22 Q. SIT has no other addresses; correct?

23 A. Correct.

24 Q. So it has no office in California, for example?

25 A. Well, no. The office in California is an Acacia 10:22

VERITEXT LEGAL SOLUTIONS
COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

Veritext Legal Solutions is committed to maintaining the confidentiality of client and witness information, in accordance with the regulations promulgated under the Health Insurance Portability and Accountability Act (HIPAA), as amended with respect to protected health information and the Gramm-Leach-Bliley Act, as amended, with respect to Personally Identifiable Information (PII). Physical transcripts and exhibits are managed under strict facility and personnel access controls. Electronic files of documents are stored in encrypted form and are transmitted in an encrypted fashion to authenticated parties who are permitted to access the material. Our data is hosted in a Tier 4 SSAE 16 certified facility.

Veritext Legal Solutions complies with all federal and State regulations with respect to the provision of court reporting services, and maintains its neutrality and independence regardless of relationship or the financial outcome of any litigation. Veritext requires adherence to the foregoing professional and ethical standards from all of its subcontractors in their independent contractor agreements.

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EXHIBIT G

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

SUPER INTERCONNECT
TECHNOLOGIES LLC,

Plaintiff,

v.

HUAWEI DEVICE CO. LTD., ET AL

GOOGLE LLC,

Defendants.

Civil Action No. 2:18-cv-00462-JRG
LEAD CASE

Civil Action No. 2:18-cv-00463-JRG

JURY TRIAL DEMANDED

**GOOGLE LLC’S NOTICE OF FED. R. CIV. P. 30(B)(6) DEPOSITION OF
SUPER INTERCONNECT TECHNOLOGIES LLC**

To: Super Interconnect Technologies LLC, by and through its counsel of record:

PLEASE TAKE NOTICE that pursuant to Rule 30(b)(6) of the Federal Rules of Civil Procedure, Defendant Google LLC (“Google”) will take the videotaped deposition of Plaintiff Super Interconnect Technologies LLC (“SIT”) at a mutually-agreed upon time and date at 515 Congress Avenue, Suite 1700, Austin, Texas 78701 or at such other time and place as the parties may agree.

The deposition will continue from day-to-day until completed or unless otherwise ordered by the Court or by agreement of the parties. The deposition will be stenographically recorded utilizing real-time reporting and will be taken before a person authorized to administer oaths in the place where the deposition is taken. The deposition will be videotaped.

Pursuant to Federal Rule of Civil Procedure 30(b)(6), SIT shall designate one or more officers, directors, agents, employees, or other persons to testify on its behalf with respect to the topics set forth in Attachment A attached hereto.

DATED: October 25, 2019

By /s/ Mark Liang
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Attorneys for Defendant Google LLC

ATTACHMENT A

DEFINITIONS

These requests incorporate, without limiting the scope of the Federal Rules of Civil Procedure, the following definitions:

1. As used herein, “Google” means Defendant Google LLC.
2. As used herein, “SIT,” “Plaintiff,” “You,” or “Your” means Super Interconnect Technologies LLC and all of its predecessors (merged, acquired, or otherwise), successors, subsidiaries, parents (including Acacia Research Group LLC and Acacia Research Corporation), sisters, divisions, departments, and affiliates thereof, and all officers, directors, principals, agents, employees, attorneys, and other persons acting on its behalf.
3. As used herein, “Lattice,” means Lattice Semiconductor Corporation and all of its predecessors (merged, acquired, or otherwise including Silicon Image), successors, subsidiaries, parents, sisters, divisions, departments, and affiliates thereof, and all officers, directors, principals, agents, employees, attorneys, and other persons acting on its behalf.
4. As used herein, “Samsung” means Samsung Electronics Co., Ltd and all of its predecessors (merged, acquired, or otherwise), successors, subsidiaries, parents, sisters, divisions, departments, and affiliates thereof, and all officers, directors, principals, agents, employees, attorneys, and other persons acting on its behalf.
5. As used herein, “LG” means “LG Electronics, Inc.” and all of its predecessors (merged, acquired, or otherwise), successors, subsidiaries, parents, sisters, divisions, departments, and affiliates thereof, and all officers, directors, principals, agents, employees, attorneys, and other persons acting on its behalf.
6. As used herein, “’092 Patent” means U.S. Patent No. 6,463,092.

7. As used herein, “’593 Patent” means U.S. Patent No. 7,158,593.
8. As used herein, “’044 Patent” means U.S. Patent No. 7,627,044.
9. As used herein, “Asserted Patents” means each or all of the ’092, ’593, and ’044 Patents.
10. As used herein, “Infringement Contentions” means SIT’s disclosures of accused products, asserted claims, and claim charts pursuant to Local Patent Rule 3-1, any amendments or supplements thereto, and any other allegations of infringement.
11. As used herein, “Asserted Claims” means each or all of the claims of the Asserted Patents that SIT contends are infringed by Google, including as identified in SIT’s Infringement Contentions, and any amendments thereto.
12. As used herein, “Prior Assignee” means any entity (including its predecessors (merged, acquired, or otherwise), successors, subsidiaries, parents) who previously was assigned or held rights in any of the Asserted Patents. “Prior Assignee” includes but is not limited to the following entities: Acacia Research Group LLC, Silicon Image, Inc., Lattice Semiconductor Corporation, Jefferies Finance, Inc., Sibeam, Inc., and DVDO, Inc.
13. As used herein, “This Litigation” means the above captioned action, *Super Interconnect Technologies LLC v. Google LLC*, 2:18-cv-00463-JRG (E.D. Tex.).
14. As used herein, “Past Litigations” means any past legal proceeding (including federal court litigations, proceedings before the USPTO, and USITC investigations) involving one or more of the Asserted Patents. Past Litigations shall include, but are not limited to: (1) *Super Interconnect Technologies LLC v. Samsung Electronics Co., Ltd. et al.*, 2-15-cv-773 (E.D. Tex.); and (2) *Super Interconnect Technologies LLC v. HP Inc.*, 1:18-cv-01728-CFC (D. Del.).

15. As used herein, “Related Litigations” means any pending legal proceeding (including federal court litigations, proceedings before the USPTO, and USITC investigations) involving one or more of the Asserted Patents. Related Litigations shall include, but are not limited to: (1) *Super Interconnect Technologies LLC v. Huawei Device Co. Ltd. et al.*, 2:18-cv-00462 (E.D. Tex.) (2) *Super Interconnect Technologies LLC v. ZTE Corporation et al.*, 3:18-cv-02932 (N.D. Tex.); (3) *Super Interconnect Technologies LLC v. HP Inc.*, 1:19-cv-00169-CFC (D. Del.); (4) *Super Interconnect Technologies LLC v. Motorola Mobility LLC*, 1:18-cv-01730-CFC (D. Del.); (5) *Super Interconnect Technologies LLC v. Lenovo Group Ltd. et al.*, 1:18-cv-01729-CFC (D. Del.) and (6) *Super Interconnect Technologies LLC v. Sony Corporation et al.*, 1:18-cv-01731-CFC (D. Del.).

16. As used herein, “Priority Date” shall mean the earliest date to which You contend a patent or patent application claims priority, whether based on an earlier-filed parent patent application, foreign or international patent application, or provisional application, or based on prior conception or reduction to practice.

17. As used herein, “Prior Art” includes any patent, patent application, printed publication, product, system, process, knowledge, use, sale or offer for sale, or other act or event defined in 35 U.S.C. §§ 102 and 103, taken alone or in combination with other art.

18. As used herein, “Accused Product(s)” means every apparatus, product, device, service, process, method, act, or other instrumentality that Plaintiff contends falls within the scope of any claim of any Asserted Patent, as identified in Plaintiff’s Infringement Contentions, and any amendments thereto, and/or any other assertion of infringement.

19. As used herein, “UFS Standard” refers to all versions of the JEDEC Standard for Universal Flash Storage, UFS, including version 2.0 (JESD220B) and 2.1 (JESD220C).

20. As used herein, “M-PHY Specification” refers to all versions of the MIPI Alliance M-PHY Specification, including version 3.0.

21. As used herein, “Standards Essential Patent Claim” means any patent claim the use of which is necessary to comply with either mandatory or optional portions of a standard (including but not limited to all versions of the M-PHY Specification and all versions of the UFS Standard) that governs a technological field adopted by a Standards Setting Organization (“SSO”).

22. As used herein, “Samsung-Acacia Agreement” shall refer to the “Confidential License And Covenant Agreement” between Acacia Research Corporation (and related entities) and Samsung, bearing production numbers SI_TECH000732-812.

23. As used herein, “LG-Acacia Agreement” shall refer to the “License And Covenant-Not-To-Sue Agreement” between Acacia Research Corporation and LG, bearing production numbers SI_TECH-007510-7525.

24. As used herein, “Apple-Acacia Agreement” shall refer to the “Settlement, Covenant, And Related Rights Agreement” between Acacia Research Corporation and Apple Inc., bearing production numbers SI_TECH-007526-7562.

25. As used herein, “SK Hynix-Acacia Agreement” shall refer to the “License And Covenant-Not-To-Sue Agreement” between Acacia Research Corporation and SK Hynix, Inc., bearing production numbers SI_TECH-007962-8007.

26. As used herein, “HDMI Forum-SIT Agreements” shall refer each or all of the “Agreement” between SIT and Lattice and the “Non-Assertion Agreement” between SIT and HDMI Forum Inc., bearing production numbers Latt-SIT-000507-516.

27. As used herein, “SIT/Acacia Agreement(s)” shall refer to any agreement conveying a license or covenant not to sue to patents to which SIT or its parents (including Acacia Research Group LLC and Acacia Research Corporation) were a party, and shall include the Samsung-Acacia Agreement, the LG-Acacia Agreement, the Apple-Acacia Agreement, the SK Hynix-Acacia Agreement, and the HDMI Forum-SIT Agreements.

28. As used herein, “SK Hynix UFS Chips” shall refer to any SK Hynix semiconductor chips that SK Hynix has marketed as compliant with a UFS Standard, and includes the following models: UFS 64GB H28U74301AMR; UFS 128GB H28U88301AMR; UFS 64GB H28S7Q302BMR; UFS 128GB H28S8Q302CMR.

29. As used herein, “Samsung UFS Chips” shall refer to any Samsung semiconductor chips that Samsung has marketed as compliant with a UFS Standard, and includes the following models: UFS 32GB KLUBG4G1CE-B0B1; UFS 128GB KLUDG8J1CB-B0B1; UFS 64GB KLUCG4J1ED-B0C1; UFS 128GB KLUDG8V1EE-B0C1; UFS 64GB KLUCG2K1EA-B0C1; UFS 128GB KLUDG4U1EA-B0C1.

30. As used herein, “SIT-Accused Samsung UFS Products” shall refer to the following Samsung smartphone products or product lines that SIT accused in its prior litigation against Samsung (see definition of “Past Litigations” above): Samsung Galaxy S6; Samsung Galaxy S6 Edge / Edge+; Samsung Galaxy S6 active; Samsung Galaxy S7; Samsung Galaxy S7 edge.

31. As used herein, “Samsung UFS Products” shall refer to any Samsung-branded, developed, or manufactured product (including end consumer devices and semiconductor chips) that Samsung has marketed as compliant or including components that are compliant with a UFS Standard, and shall include Samsung UFS Chips, the SIT-Accused Samsung UFS Products, and

at least the following additional products or product lines: Samsung Galaxy S8 / S8+; Samsung Galaxy S9 / S9+; Samsung Galaxy S10 / S10+

32. As used herein, “Samsung HDMI Products” shall refer to any Samsung-branded, developed, or manufactured product (including end consumer devices and semiconductor chips) that Samsung has marketed as compliant or including components that are compliant with the HDMI Specification, version 2.1 (or “HDMI 2.1”) or earlier, and includes the following products or product lines: Q900R; Q60; Q70; Q80; Q90; and RU8000.

33. As used herein, “LG UFS Products” shall refer to any LG-branded, developed, or manufactured product that LG has marketed as compliant or including components that are compliant with a UFS Standard, and includes the following products or product lines: V50 ThinQ; V40 ThinQ; V30; G7 ThinQ.

34. As used herein, “LG HDMI Products” shall refer to any LG-branded, developed, or manufactured product (including end consumer devices and semiconductor chips) that LG has marketed as compliant or including components that are compliant with the HDMI Specification, version 2.1 (or “HDMI 2.1”) or earlier, and includes the following products or product lines: W9; E9; C9; Z9; NanoCell LED-LCD 9500; NanoCell LED-LCD 9000; NanoCell LED-LCD 8600.

35. As used herein, “Samsung/LG Products” shall refer to the Samsung UFS Products, Samsung HDMI Products, LG UFS Products, and LG HDMI Products.

TOPICS OF TESTIMONY

1. The current and former corporate structure, composition, organization, ownership, and management of SIT.
2. Products or services that SIT has made, distributed, sold, or offered for sale at any

time.

3. The identity of all persons and entities with current and former ownership interests or investment in SIT, including Acacia Research Group LLC, and the interest that each possessed.

4. The origin and management of SIT's patent portfolio, including but not limited to the acquisition of patents and patent applications, divestment of patents, patent prosecution, maintenance fees, and licensing.

5. SIT's current business model, products or services, goals, and corporate strategy, including any business plans, licensing plans, or strategy plans related to the Asserted Patents.

6. The nature, scope, and performance of any due diligence conducted by or on behalf of SIT in connection with its acquisition of the Asserted Patents, including without limitation the existence and terms of prior licenses or covenants, validity, claim scope, infringement, or enforceability.

7. All facts relating to the ownership, title, chain-of-title, or interest (including transfer, sale, or assignment of any such interest) of or in the Asserted Patents to or from SIT.

8. Any agreements among SIT, any of the Prior Assignees, and/or any of the named inventors of the Asserted Patents (Gyudong Kim, Min-Kyu Kim, Seung Ho Hwang, Ook Kim, Bruce Kim, Won Jun Choe, Deog-Kyoon Jeong, Jaeha Kim, and Bong-Joon Lee), including without limitation any agreements relating to interests in the Asserted Patents, This Litigation, or any of the Related Litigations.

9. Any interest that Lattice currently holds in the Asserted Patents, This Litigation, the Related Litigations, or Past Litigations, and the terms of any such interest.

10. Lattice's involvement in the management of SIT's patent portfolio, including the Asserted Patents, This Litigation, the Related Litigations, or Past Litigations.

11. The scope, content, terms, and circumstances surrounding the HDMI Forum-SIT Agreements.

12. The Priority Date for each of the Asserted Patents, including whether any of the Asserted Patents are entitled to a priority date earlier than the filing date of the latest U.S. application that resulted in issuance of the Asserted Patents.

13. The conception and reduction to practice for each alleged invention claimed in the Asserted Patents, including, without limitation, an identification of the date each such alleged invention was first conceived, the date each such alleged invention was first reduced to practice, all evidence of reasonable diligence between conception and the date of reduction to practice, and all persons who participated in the conception and reduction to practice of each alleged invention claimed in the Asserted Patents.

14. The preparation and prosecution of the Asserted Patents, including: the identity and role of all persons involved in the preparation and prosecution of the Asserted Patents; the content and location of all documents related to the preparation and prosecution of the Asserted Patents; and communications related to the preparation and prosecution of the Asserted Patents, including without limitation communications with the PTO.

15. The facts that form the bases for SIT's allegations that Google has infringed and continues to infringe the Asserted Claim of the Asserted Patents, including the facts and circumstances that form the bases for SIT's Infringement Contentions.

16. Any evidence of non-infringing alternatives to the alleged inventions claimed in the Asserted Patents, including evidence of its commercial acceptability, cost, or technical viability.

17. All information, facts, circumstances, and documents supporting or relating to any alleged specific intent by Google to infringe or encourage others to infringe the Asserted Patents.

18. The identity, content, and date of discovery of any Prior Art identified at any time to the Asserted Patents known to SIT.

19. Your knowledge and the bases of that knowledge regarding: (a) the identity of each person who tried and failed to achieve solutions to the problem solved by the alleged invention(s) claimed in the Asserted Patents; (b) the long-felt need, if any, solved by the alleged invention(s) claimed in the Asserted Patents solve; (c) the unexpected results achieved by the alleged invention(s) claimed in the Asserted Patents; (d) the identity of people expressing skepticism, and the content of that skepticism, about whether the alleged invention(s) claimed in the Asserted Patents would work; (e) the identity of each person or entity that has copied the alleged invention(s) claimed in the Asserted Patents and the dates and facts of that copying; (f) the identity of each product that embodies the alleged invention(s) claimed in the Asserted Patents, and the commercial success of each such product; (g) praise that has been given to the Asserted Patents by anyone.

20. Your pre-suit investigation of whether the Asserted Claims are Standards Essential Patent Claims, including your pre-suit investigation of whether the Asserted Claims are essential or necessary to the UFS Standard and/or M-PHY Specification.

21. Your pre-suit investigation of whether the Asserted Claims are subject to any licensing obligations or encumbrances to MIPI Alliance or JEDEC, including your pre-suit investigation of whether the Asserted Claims must be licensed on RAND or royalty-free terms.

22. Whether SIT or any Prior Assignee (including Silicon Image) has made any patent disclosures, patent licensing declarations, or submissions that identified or encompassed the Asserted Patents to any standards organization, including MIPI Alliance and JEDEC.

23. The membership of SIT or any Prior Assignee (including Silicon Image) in JEDEC and the MIPI Alliance.

24. SIT's financial performance since 2012, including, without limitations, revenues (including licensing revenues), profits, assets, costs (including litigation costs and operation costs) as well the percentage breakdown of sources of revenue by licensee or customer/client and by type of activity (including patent licensing, technology licensing, product sales, or engineering services).

25. Facts regarding the value of the Asserted Patents, including without limitation, any analysis, investigation, or opinion regarding the value of the Asserted Patents, or any other documents evidencing, memorializing, concerning, or documenting all such valuations, and the roles and responsibilities of all involved persons.

26. All licenses, settlement agreements, covenants, or assignments of rights entered into by SIT and/or Prior Assignees that convey rights to the Asserted Patents, including without limitation: the terms of any agreements; negotiations, whether successful or not; any persons to whom any such licenses or assignment or rights were made or attempted to be made; the process of identifying potential licensees; the revenue received by SIT for those licenses or other assignment of rights; and the royalty rates or sums at which any licenses were granted.

27. The scope, content, terms, and circumstances surrounding the Samsung-Acacia Agreement, including whether the SIT-Accused Samsung UFS Products and Samsung UFS Chips are licensed under the agreement.

28. The scope, content, terms, and circumstances surrounding the SK Hynix-Acacia Agreement, including whether SK Hynix UFS Chips are licensed under the agreement.

29. Any analysis of licenses for comparable patents or technology that would assist in determining a reasonable royalty for the Asserted Patents, including but not limited to any documents evidencing, memorializing, concerning, or documenting any such analysis, and the

location of such documents.

30. The alleged innovation of the claimed inventions of the Asserted Patents, including the alleged innovation, value, and usefulness over the Prior Art and the incremental sales, revenue, or profit attributable to the use of the technology claimed in any of the Asserted Patents in any product, system, or method, including but not limited to any documents evidencing, memorializing, concerning, or documenting any such incremental sales, revenue, or profit, and the location of such documents.

31. The demand for any feature(s), functionality(ies), and/or attribute(s) embodied in any claim of the Asserted Patents, including any research or study regarding whether the technology in any of the Asserted Patents drives or drove consumer demand for any product, system, or method, including but not limited to any documents evidencing, memorializing, concerning, or documenting any such demand, and the location of such documents.

32. All information related to the advantages and disadvantages of any feature of each of Google's Accused Products that You contend embodies any of the asserted claims of the Asserted Patents and any valuation of any such feature or contribution of any such feature to the value of any product containing any such feature.

33. Products or services used, manufactured, sold, or offered for sale by any Prior Assignee (including Silicon Image) that embodies or practices the invention of any claim of any of the Asserted Patents.

34. SIT's efforts, if any, to ensure that any licensees to the Asserted Patents complied with the marking provisions of 35 U.S.C. § 287(a), including with respect to the Samsung/LG Products.

35. The labeling or marking with patent information any product, service, system, or

method with any of the Asserted Patents, including but not limited to any documents evidencing, memorializing, concerning, or documenting any such labeling or marking, and the location of such documents.

36. The identity, location, employer, and job title of all persons who communicated with your designee(s) in preparation for these Topics.

37. Any fee agreements between SIT and its counsel or any other parties, concerning This Litigation, including, without limitation, contingency fee arrangements.

38. All persons having a financial or non-financial interest in the outcome of This Litigation, as well as the amount or percentage of such interests, and the relationship between SIT and each person with such an interest, including but not limited to any documents evidencing, memorializing, concerning, or documenting any such decision, involvement, or financial or pecuniary interest, and the location of such documents.

CERTIFICATE OF SERVICE

I hereby certify that on October 25, 2019, a true and correct copy of the foregoing document was served on all counsel of record via electronic mail.

/s/ Mark Liang

EXHIBIT H

Table C-5.
U.S. District Courts—Median Time Intervals From Filing to Disposition of Civil Cases Terminated, by District and Method of Disposition,
During the 12-Month Period Ending December 31, 2020

Circuit and District	Total Cases		No Court Action		Court Action			
	Number of Cases	Median Time Interval in Months	Number of Cases	Median Time Interval in Months	Before Pretrial		During or After Pretrial	
					Number of Cases	Median Time Interval in Months	Number of Cases	Median Time Interval in Months
Total	220,097	8.9	44,840	4.6	132,718	8.0	41,540	26.9
DC	3,039	5.3	793	3.7	2,226	6.4	11	14.0
1st	4,091	10.2	1,428	6.0	1,874	10.8	753	15.6
ME	394	9.2	108	5.2	276	10.1	5	-
MA	2,074	9.1	994	5.7	473	7.6	584	15.6
NH	341	8.6	94	3.3	175	8.9	71	14.9
RI	480	10.4	52	10.2	355	9.7	69	15.9
PR	802	14.5	180	11.5	595	14.7	24	29.2
2nd	20,836	8.5	3,503	3.7	13,175	8.4	4,039	13.9
CT	1,561	9.4	316	3.3	766	8.8	468	17.4
NY,N	1,155	9.0	218	5.0	678	8.6	256	16.6
NY,E	5,917	8.8	1,148	4.2	3,363	8.9	1,374	13.0
NY,S	10,001	6.7	1,696	3.2	6,336	6.1	1,903	13.4
NY,W	1,991	14.9	97	5.2	1,854	15.0	36	29.3
VT	211	9.8	28	4.5	178	10.8	2	-
3rd	18,819	7.8	2,790	3.5	12,142	7.7	3,765	11.9
DE	1,835	6.9	661	3.2	927	8.0	189	15.4
NJ	8,747	10.1	536	2.9	5,409	9.7	2,781	13.0
PA,E	4,630	6.0	741	5.0	3,170	5.4	699	8.4
PA,M	1,389	10.8	268	8.2	1,074	11.3	41	13.3
PA,W	2,005	5.6	448	2.0	1,541	7.0	6	-
VI	213	14.0	136	9.4	21	46.1	49	18.6
4th	12,161	10.9	1,887	5.8	9,127	11.9	1,090	11.4
MD	2,437	9.1	156	5.5	1,855	8.4	418	13.7
NC,E	811	9.6	407	6.9	387	11.3	11	20.7
Total	220,097	8.9	44,840	4.6	132,718	8.0	41,540	26.9
DC	3,039	5.3	793	3.7	2,226	6.4	11	14.0
1st	4,091	10.2	1,428	6.0	1,874	10.8	753	15.6
ME	394	9.2	108	5.2	276	10.1	5	-
MA	2,074	9.1	994	5.7	473	7.6	584	15.6
NH	341	8.6	94	3.3	175	8.9	71	14.9
RI	480	10.4	52	10.2	355	9.7	69	15.9
PR	802	14.5	180	11.5	595	14.7	24	29.2
2nd	20,836	8.5	3,503	3.7	13,175	8.4	4,039	13.9
CT	1,561	9.4	316	3.3	766	8.8	468	17.4
NY,N	1,155	9.0	218	5.0	678	8.6	256	16.6
NY,E	5,917	8.8	1,148	4.2	3,363	8.9	1,374	13.0
NY,S	10,001	6.7	1,696	3.2	6,336	6.1	1,903	13.4
NY,W	1,991	14.9	97	5.2	1,854	15.0	36	29.3
VT	211	9.8	28	4.5	178	10.8	2	-
3rd	18,819	7.8	2,790	3.5	12,142	7.7	3,765	11.9
DE	1,835	6.9	661	3.2	927	8.0	189	15.4
NJ	8,747	10.1	536	2.9	5,409	9.7	2,781	13.0
PA,E	4,630	6.0	741	5.0	3,170	5.4	699	8.4
PA,M	1,389	10.8	268	8.2	1,074	11.3	41	13.3
PA,W	2,005	5.6	448	2.0	1,541	7.0	6	-
VI	213	14.0	136	9.4	21	46.1	49	18.6
4th	12,161	10.9	1,887	5.8	9,127	11.9	1,090	11.4
MD	2,437	9.1	156	5.5	1,855	8.4	418	13.7
NC,E	811	9.6	407	6.9	387	11.3	11	20.7

NC,M	542	9.2	361	8.0	162	10.6	17	17.3	2	-
NC,W	820	8.5	84	3.4	492	7.7	240	11.4	4	-
SC	2,208	10.3	216	3.1	1,933	11.0	42	10.6	17	33.4
VA,E	1,811	6.3	492	5.0	1,006	5.7	302	8.7	11	16.9
VA,W	611	11.7	68	6.0	534	12.6	4	-	5	-
WV,N	316	8.9	55	5.9	218	7.7	42	15.7	1	-
WV,S	2,605	62.8	48	12.1	2,540	62.8	14	15.9	3	-
5th	38,327	20.6	6,340	5.9	15,606	10.8	16,234	36.0	147	21.2
LA,E	17,783	34.9	822	8.5	2,381	10.4	14,565	37.3	15	21.2
LAM	1,029	25.6	188	22.2	827	25.9	9	-	5	-
LA,W	1,025	11.1	172	5.9	646	10.8	197	16.3	10	21.4
MSN	585	9.2	121	4.5	163	7.8	298	10.3	3	-
MS,S	1,559	7.1	853	6.7	687	9.0	8	-	11	19.6
TX,N	6,445	13.7	417	3.5	6,005	15.4	5	-	18	22.1
TX,E	1,991	8.9	835	6.3	1,112	10.5	23	20.7	21	19.8
TX,S	4,881	8.2	2,076	5.5	1,922	8.1	844	12.1	39	23.1
TX,W	3,029	6.7	856	4.2	1,863	6.8	285	14.6	25	20.0
6th	12,521	9.5	3,730	7.0	5,981	9.0	2,747	13.0	63	31.2
KY,E	790	9.3	119	4.3	657	10.1	8	-	6	-
KY,W	1,160	8.7	254	5.8	880	9.2	22	14.8	4	-
MI,E	2,535	9.6	554	5.3	811	5.7	1,159	13.6	11	34.3
MI,W	980	8.2	80	2.2	595	5.3	301	20.7	4	-
OH,N	2,549	9.8	813	8.3	921	9.9	811	10.3	4	-
OH,S	2,054	9.6	981	6.7	695	11.1	370	14.0	8	-
TN,E	806	11.1	275	8.2	454	12.2	70	14.8	7	-
TN,M	929	10.6	282	10.8	631	10.5	1	-	15	25.8
TN,W	718	8.7	372	8.1	337	9.3	5	-	4	-
7th	17,568	12.4	2,999	4.0	8,283	9.0	6,231	49.5	55	31.2
IL,N	10,425	21.3	1,801	4.4	3,906	8.1	4,697	56.2	21	35.2
IL,C	627	10.4	253	6.2	370	12.6	1	-	3	-
IL,S	910	14.3	239	5.6	670	21.3	1	-	0	-
IN,N	1,367	11.7	85	4.3	880	10.9	393	15.3	9	-
IN,S	2,355	8.0	221	1.7	1,234	6.5	890	10.7	10	32.0
WI,E	1,176	7.5	150	3.0	972	8.0	49	11.4	5	-
WI,W	708	7.0	250	3.1	251	9.0	200	11.0	7	-
8th	8,945	8.9	3,386	5.4	4,031	8.9	1,475	44.3	53	25.3
AR,E	871	10.9	420	10.7	437	10.7	2	-	12	26.1
AR,W	539	10.1	6	-	481	9.7	51	11.1	1	-

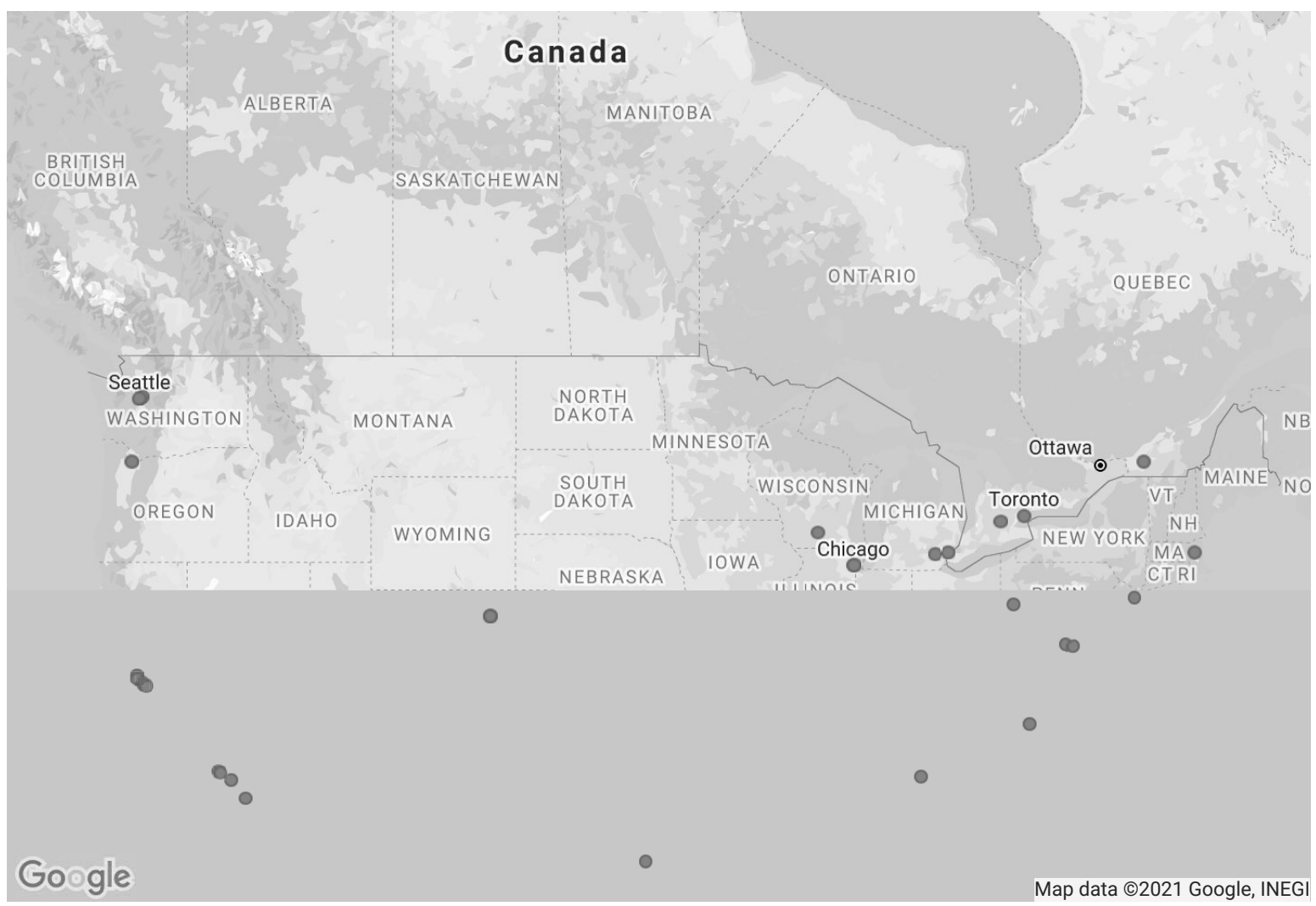
IA,N	278	9.2	80	6.3	194	10.9	1	-	3	-
IA,S	335	7.4	138	6.8	192	7.6	1	-	4	-
MN	2,845	11.4	1,269	4.0	207	8.5	1,363	46.3	6	-
MO,E	1,808	5.6	819	4.4	983	6.7	1	-	5	-
MO,W	1,323	7.2	438	5.8	816	8.2	55	8.8	14	21.0
NE	508	7.9	132	6.4	374	8.3	0	-	2	-
ND	226	11.5	10	1.8	213	11.8	0	-	3	-
SD	212	11.0	74	10.6	134	11.3	1	-	3	-
9th	38,921	8.1	9,891	4.5	26,285	9.2	2,606	13.9	139	28.9
AK	234	8.5	28	2.8	206	9.0	0	-	0	-
AZ	5,029	13.9	72	2.8	4,572	14.0	370	14.9	15	30.7
CA,N	7,005	11.3	2,529	5.6	3,329	15.9	1,134	16.1	13	36.2
CA,E	2,304	9.5	844	6.7	1,429	11.1	26	26.7	5	-
CA,C	14,233	4.8	3,677	3.2	10,287	5.9	219	8.8	50	25.3
CA,S	1,850	6.2	383	3.1	930	5.7	526	11.5	11	50.2
HI	479	7.3	221	7.7	252	6.9	3	-	3	-
ID	351	12.1	49	3.2	268	12.9	31	14.0	3	-
MT	395	9.6	73	3.4	148	7.3	170	13.0	4	-
NV	2,305	10.4	997	8.5	1,195	12.2	104	8.6	9	-
OR	1,490	11.9	355	6.3	1,120	12.7	5	-	10	26.4
WA,E	931	7.6	52	4.7	878	7.7	1	-	0	-
WA,W	2,268	7.4	595	5.2	1,644	7.8	13	24.1	16	22.8
GUAM	31	12.6	9	-	18	10.5	4	-	0	-
NMI	16	6.1	7	-	9	-	0	-	0	-
10th	7,618	8.8	1,729	5.4	4,992	9.1	836	13.1	61	28.9
CO	2,646	7.6	765	5.9	1,795	8.0	66	18.2	20	31.7
KS	1,188	8.4	147	4.7	904	8.2	122	14.5	15	23.1
NM	884	9.1	102	1.4	409	8.3	370	12.2	3	-
OK,N	527	11.5	38	2.6	482	12.1	4	-	3	-
OK,E	324	13.5	11	2.1	307	13.8	2	-	4	-
OK,W	889	8.3	370	6.9	328	7.7	186	11.1	5	-
UT	981	11.5	206	5.9	742	12.5	27	20.4	6	-
WY	179	10.1	90	5.3	25	5.8	59	13.8	5	-
11th	37,251	5.0	6,364	4.3	28,996	5.0	1,753	11.2	138	24.2
AL,N	1,573	11.4	56	2.5	1,496	11.5	7	-	14	35.7
AL,M	492	10.6	64	6.9	411	10.7	8	-	9	-
AL,S	937	4.8	74	3.1	846	4.9	7	-	10	27.5
FL,N	13,694	5.0	3,517	4.4	10,158	5.0	3	-	16	16.3

FL,M	6,471	6.2	365	3.6	5,934	6.1	143	12.9	29	24.3
FL,S	8,471	3.2	1,365	3.6	7,010	3.0	57	7.6	39	21.0
GA,N	4,409	6.0	556	3.0	2,318	4.1	1,520	11.0	15	31.7
GA,M	647	7.3	174	5.0	464	8.1	6	-	3	-
GA,S	557	9.0	193	8.0	359	9.4	2	-	3	-

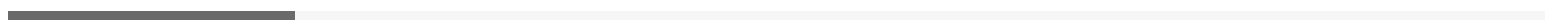
NOTE: Median time intervals are not computed when fewer than 10 cases reported. This table excludes land condemnations, prisoner petitions, deportation reviews, recovery of overpayments, and enforcement of judgments. Includes cases filed in previous years as consolidated cases that thereafter were severed into individual cases. For fiscal years prior to 2001, this table included data on recovery of overpayments and enforcement of judgments.

EXHIBIT I

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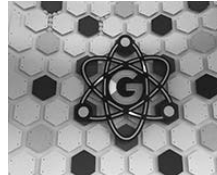


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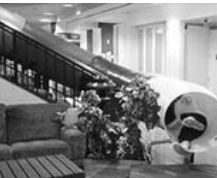
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**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

**SUPER INTERCONNECT
TECHNOLOGIES, LLC,**

Plaintiff,

v.

GOOGLE LLC,

Defendant.

6:21-CV-00259-ADA

ORDER DENYING DEFENDANT'S MOTION TO TRANSFER

This is an action for patent infringement allegedly committed by defendant Google LLC (“Google”). Google now moves to transfer the above case to the Northern District of California (“NDCA”) pursuant to 28 U.S.C § 1404(a). ECF No. 14. Google filed its motion on April 27, 2021. ECF No. 14. Plaintiff Super Interconnect Technologies (“SIT”) filed its Response on May 18, 2021, ECF No. 34, and Google filed a Reply in Support of its Motion on July 2, 2021. ECF No. 44. After considering all related briefings and the relevant law, Google’s Motion to Transfer is **DENIED**.

I. FACTUAL BACKGROUND

On November 2, 2018, SIT filed suit in the Eastern District of Texas (EDTX) for patent infringement, asserting U.S. Patent Nos. 7,627,044; 6,463,092; and 7,158,593 (“Patents-in-Suit”) against Google. ECF No. 14 at 2. The parties then began pre-trial discovery. The parties completed claim construction, with the EDTX issuing a *Markman* order. The parties also completed fact discovery, including depositions of party and non-party witnesses, and partially completed expert discovery. ECF No. 14 at 3. Google later filed a motion to dismiss the case for improper venue, which the EDTX denied. ECF No. 14 at 2. On February 13, 2020, the Federal

Circuit granted Google's petition for a writ of mandamus and ordered the EDTX to dismiss or transfer the case. *In re Google LLC*, 949 F.3d 1338, 1339 (Fed. Cir. 2020). On March 12, 2021, in compliance with the Federal Circuit's order, the EDTX dismissed SIT's case. ECF No. 1 at 3.

SIT then filed a substantively identical complaint with this Court for patent infringement on March 15, 2021. ECF No. 1 at 1. The parties then filed a Joint Motion Regarding Case Management and Discovery into Newly-Released Products which allows all written discovery responses, document production, and other evidence from the EDTX action to be used in the instant action as if it had been served, produced, or obtained in this case. ECF No. 34 at 2–3. The Court has also adopted the claim constructions from the EDTX action. ECF No. 34 at 3.

Both Google and SIT manufacture telecommunication equipment. Google LLC is a subsidiary of Alphabet Inc. ECF No. 1 at 1. It is a limited liability company incorporated under the laws of Delaware, and its principal place of business is in Mountainview, California. *Id.* SIT is a Texas limited liability company, and its principal place of business is in Frisco, Texas. ECF No. 14 at 4. Google's relevant documents are located in California, but these documents are all electronically available, and SIT's outside counsel retained copies of the documents on its server in Dallas, Texas. ECF No. 34 at 10. Google identified five employees it claims have information relevant to the Patent-In-Suit; these employees reside in California. ECF No. 14 at 5. These employees were deposed in the EDTX action, and it is unclear if they will be witnesses for trial. *Id.* SIT identified three witnesses it intends to call at trial, two of which reside in California while the other resides in Texas.

II. STANDARD OF REVIEW

Neither party disputes that the Western District of Texas is a proper venue to try this case. Thus, this Court need not decide the question of whether SIT met its burden to prove proper venue under 28 U.S.C. § 1400(b). *Westech Aerosol Corp v. 3M Co.*, 927 F.3d 1378, 1382 (Fed. Cir. 2019) (holding that “the plaintiff has the burden of establishing proper venue under 28 U.S.C. § 1400(b).”).

Even if venue is proper as this Court assumes, “a district court may transfer any civil action to any other district or division where it might have been brought or to any district or division to which all parties have consented” if it serves “the convenience of parties and witnesses....” 28 U.S.C. § 1404(a). Therefore, a motion for transfer involves a two-step analysis: first, whether the case could have been properly brought in the proposed transferee district; and second, whether transfer would promote the interest of justice and/or the convenience of the parties and witnesses. *In re Volkswagen of America, Inc.*, 545 F.3d 304, 312, 314 (hereinafter “*Volkswagen IP*”) (5th Cir. 2004) (en banc).

Answering the preliminary question requires a determination of whether the proposed transferee venue is proper. If it is not, the Court’s analysis ends there. First, a plaintiff may file a patent infringement action “in the judicial district where the defendant resides.” 28 U.S.C. § 1400(b). The Supreme Court defined residence for purposes of § 1400(b) as the defendant’s state of incorporation. *TC Heartland LLC v. Kraft Foods Grp. Brands LLC*, 137 S. Ct. 1514, 1517 (2017). Alternatively, a plaintiff may establish proper venue by showing that the defendant committed acts of infringement in the district and has a regular and established place of business. 28 U.S.C. § 1400(b). A defendant has a regular and established place of business if the plaintiff proves first that there is a “physical place in the district”; second that it is a “regular and established

place of business”; and third that it is “the place of the defendant.” *In re Cray Inc.*, 871 F.3d 1355, 1360 (Fed. Cir. 2017).

Additionally, Fifth Circuit courts “should ... grant” a § 1404(a) motion if the movant can show his proposed forum is “clearly more convenient.” *Volkswagen II*, 545 F.3d at 315. The Fifth Circuit further held that “[t]he determination of ‘convenience’ turns on a number of public and private interest factors, none of which can be said to be of dispositive weight.” *Action Indus., Inc. v. US. Fid. & Guar. Co.*, 358 F.3d 337, 340 (5th Cir. 2004). The private factors include: “(1) the relative ease of access to sources of proof; (2) the availability of compulsory process to secure the attendance of witnesses; (3) the cost of attendance for willing witnesses; and (4) all other practical problems that make trial of a case easy, expeditious and inexpensive.” *In re Volkswagen AG*, 371 F.3d 201, 203 (hereinafter “*Volkswagen I*”) (5th Cir. 2004) (citing *Piper Aircraft Co. v. Reyno*, 454 U.S. 235, 241 n.6 (1982)). The public factors include: “(1) the administrative difficulties flowing from court congestion; (2) the local interest in having localized interests decided at home; (3) the familiarity of the forum with the law that will govern the case; and (4) the avoidance of unnecessary problems of conflict of laws of the application of foreign law.” *Id.*

The burden to show that a case should be transferred for convenience falls on the on the moving party. *In re Vistaprint Ltd.*, 628 F.3d 1342, 1346 (Fed. Cir. 2010). A plaintiff’s choice of venue is not an independent factor in the venue transfer analysis, and courts must not give inordinate weight to a plaintiff’s choice of venue. *Id.* at 313. However, “when the transferee venue is not *clearly more convenient* than the venue chosen by the plaintiff, the plaintiff’s choice should be respected.” *Id.* at 315.

III. DISCUSSION

A. SIT could have brought this suit in the Northern District of California

SIT could have brought its case in California. Google was not incorporated in California and therefore does not reside in the state as the *TC Heartland* Court defined residence. 137 S. Ct. at 1517. However, Google “designed, tested, marketed, and sold the accused products” in California. ECF No. 1 at 3. Additionally, the fact that Google’s principal place of business is in Mountainview, California (within the Northern District) shows that it has a regular and established place of business in the NDCA. ECF No. 1 at 1. Google’s headquarters are a “physical place in the district” that is “regular and established” and is “the place of the defendant.” *See Cray*, 871 F.3d at 1360. Therefore, Google satisfies the first prong of the test: the proposed transferee district is a proper venue in this case.

B. Google failed to show that the Northern District of California is clearly more convenient than the Western District of Texas.

Google has not established that the NDCA is sufficiently more convenient to require a transfer. Google must show that its proposed forum is “clearly more convenient” than the forum in which the case is currently pending. *Volkswagen II*, 545 F.3d at 315. Added together, no factor favors transfer to the NDCA while two factors weigh against it, the other six being neutral. Accordingly, the Northern District of California is not “clearly more convenient,” and the case should remain in the Western District of Texas.

1. The private *Volkswagen* factors weigh against transfer.

a. The “relative ease of access to sources of proof” factor is neutral.

First, the “relative ease of access to sources of proof” factor is neutral. Google asserts that nearly All of Google’s relevant documents are located in the NDCA. ECF No. 14 at 3. SIT

argues that because Google's relevant documents and other evidence are mostly electronic and therefore easily accessible from anybody with a computer and internet connection, this factor is neutral. ECF No. 34 at 10. Non-party Qualcomm's source code are the only non-electronic documents in the suit. These documents are stored in Qualcomm's facility in California; however, SIT claims that a copy of these documents is stored in a secure office in Dallas, Texas. ECF No. 34 at 10. The parties expect Google to produce supplemental financial discovery, but all previous document productions have been made electronically to SIT's outside counsel in Dallas.

Under Fifth Circuit precedent, the electronic availability of evidence does not outweigh the physical location of the evidence for this factor. *See In re Genentech*, 566 F.3d 1338, 1345 (Fed. Cir. 2009). The Court noted that "[i]n patent infringement cases, the bulk of the relevant evidence usually comes from the accused infringer. Consequently, the place where the defendant's documents are kept weighs in favor of transfer to that location." *Id.* At first glance, because the Qualcomm source code and Google financial information are stored in the NDCA, this factor weighs in favor of transfer. But because the copies of the non-electronic documents are kept close by in Dallas, and all discovery has been electronic thus far, this factor does not favor NDCA. Moreover, the parties already completed fact discovery in EDTX, making this factor of lesser importance. This factor is therefore neutral.

b. Google failed to prove that the "compulsory process" factor favors transfer.

Google argues that the "compulsory process" factor favors transfer. To carry its burden on this factor, Google must establish that the witnesses it intends to call are unwilling to testify. "When no party has alleged or shown any witness's unwillingness, a court should not attach much weight to the compulsory process factor." *CloudfChange, LLC v. NCR Corp.*, No. 6-19-

CV-00513, 2020 WL 6439178, at *4 (W.D. Tex. Mar. 17, 2020) (citing *Duha v. Agrium, Inc.*, 448 F.3d 867, 877 (6th Cir. 2006)).

Google argues that because several of its employees that were deposed in the EDTX action live in California and are thus under the subpoena power of the NDCA, this factor favors transfer. ECF No. 14 at 11. But Google did not state that it would call any of its own witnesses to trial, nor that any of the witnesses are unwilling to testify in the current forum. Additionally, Google identified non-party employees from Qualcomm’s San Diego headquarters, two non-party inventors, and a non-party Lattice employee. ECF No. 14 at 11. Although these non-party witnesses live in California, and thus live within the subpoena range of the NDCA, Google did not provide evidence that any of these non-party witnesses are unwilling to testify without a subpoena. Therefore, Google does not satisfy its burden to tilt the weight of the “compulsory process” factor toward transfer. This factor is therefore neutral.

c. The “cost of attendance for willing witnesses” factor is neutral.

The most important factor in the transfer analysis is the convenience of the witnesses. *SynKloud Techs., LLC v. Dropbox, Inc.*, No. 6:19-CV-00525-ADA, 2020 WL 2494574, at *4 (W.D. Tex. May 14, 2020); *Genentech, Inc.*, 566 F.3d at 1342. “When the distance between an existing venue for trial of a matter and a proposed venue under §1404(a) is more than 100 miles, the factor or inconvenience to witnesses increases in direct relationship to the additional distance to be travelled.” *Volkswagen II*, 545 F.3d at 317 (quoting *Volkswagen I*, 371 F.3d at 203); *Frederick v. Advanced Fin. Sols., Inc.*, 558 F.Supp.2d 699, 704 (E.D. Tex. 2007).

When considering this factor, the Court should consider all potential material and relevant witnesses. *Alacritech Inc. v. CenturyLink, Inc.*, No. 2:16-CV-00693, 2017 WL 4155236, at *5 (E.D. Tex. Sept. 19, 2017). However, “the convenience of party witnesses is given little

weight.” *Moskowitz Family LLC v. Globus Med., Inc.*, No. 6:19-CV-00672-ADA, 2020 WL 4577710, at *4 (W.D. Tex. Jul. 2, 2020). Greater weight is given to a willing non-party witness than to the employees of a party. *Kuster v. Western Digital Techs., Inc.*, No. 6:20-CV-00563-ADA, 2021 WL 466147, at *6 (W.D. Tex. Feb. 9, 2021). For the reasons discussed below, this Court finds that this factor is neutral.

Google contends that its employees with relevant knowledge of the Patents-in-Suit reside in the NDCA, which would significantly reduce travel times and time spent away from work and the community. ECF No. 14 at 8. As for non-party witnesses, Google states that two inventors of the Patents-in-Suit, Gyudong Kim and Min-Kyu Kim, live in the Bay Area, a Lattice employee Jamie Garcia lives in San Jose, and Qualcomm employees live in San Diego.

SIT intends to call non-party witness Holly Hernandez at trial. ECF No. 34 at 13. SIT states that Ms. Hernandez has intimate knowledge of SIT’s services and corporate structure because she is the former Director and Senior VP of SIT. Ms. Hernandez lives in Frisco, Texas and stated that travel to the NDCA would be far less convenient and more expensive. ECF No. 34 at 13. SIT further showed that witnesses Eric Lucas and Marc Booth, both of whom live in Irvine, California, indicated that they were willing to travel to Waco and that it would be convenient. ECF No. 34 at 13–14.

The arguments here point in both directions. Google argues that the NDCA would be more convenient for its party witnesses, while SIT argues WDTX is convenient for its party witnesses. But, as stated above, the Court gives little weight to the convenience of party witnesses. Of the non-party witnesses, both parties have witnesses that reside outside of the transferor and transferee districts, with Qualcomm employees living in San Diego and Ms. Hernandez living in Frisco. Notably, SIT has indicated it intends call Ms. Hernandez, who is

willing to testify, while Google has not identified which Qualcomm employees it intends to call and has not indicated if they are unwilling to testify. Although it is true that the inventors and Mr. Garcia live in the NDCA, Google has not stated that it intends to call these witnesses at trial, despite this case being at an advanced stage of litigation. “[T]he Court assumes that no more than a few party witnesses—and even fewer third-party witnesses, if any—will testify live at trial.” *Fintiv v. Apple, Inc.*, No. 6:18-CV-00372-ADA, 2019 WL 4743678, at *6 (W.D. Tex. Sept. 13, 2019). Given that these witnesses have already been deposed in the EDTX action, and Google has not indicated why the deposition testimony is insufficient, Google fails to show concretely how this factor significantly favors transfer. For those reasons, the Court finds this factor to be neutral.

d. The “all other practical problems” factor weighs against transfer.

The final private *Volkswagen* factor weighs against transfer. When analyzing this factor, a court considers “all other practical problems that make trial of a case easy, expeditious and inexpensive.” *Volkswagen II*, 545 F.3d at 314. “Practical problems include those that are rationally based on judicial economy.” *Wahlstrom v. B & A Carrier LLC*, No. 2:18-CV-00313-JRG, 2019 WL 130296, at *4 (E.D. Tex. Jan. 8, 2019). A party’s delay in filing a motion to transfer is considered under this factor. *Diem LLC v. BigCommerce, Inc.*, No. 6:17-CV-00186-JRG, 2017 WL 6729907, at *4–5 (E.D. Tex. Dec. 28, 2017).

In its reply to Google’s Motion, SIT urges the Court to consider the proceedings of the EDTX action that preceded this case. ECF No. 34 at 6. Throughout the two years of litigation in the EDTX action, Google never filed a motion to transfer due to an inconvenient venue. SIT contends that transferring venues would cause delay and would further prejudice SIT. ECF No. 34 at 6.

Due to the significant amount of discovery and litigation already completed in the EDTX action, and that the parties and this Court have agreed to reuse the discovery information, this case is already at an advanced stage. Furthermore, it is not guaranteed that the NDCA would accept the claim constructions or allow the parties to reuse the discovery of the EDTX action. While judicial economy alone cannot justify denying a § 1404 motion to dismiss, it does tip the final private factor against transfer due to the unique circumstances of this case.

2. The public *Volkswagen* factors weigh against transfer.

a. The “local interest” factor is neutral.

The first public interest factor, “local interest,” is neutral. While Google was founded and headquartered in Northern California, it is a global corporation (incorporated in Delaware) whose business practices affect companies all over the world. The NDCA would certainly have an interest in this case because the cause of action “calls into question the work and reputation of several individuals residing in or near that district.” *In re Hoffmann-La Roche Inc.*, 587 F.3d 1333, 1336 (Fed. Cir. 2008). But this district also has an interest in the disposition of this case given that SIT is a Texas LLC that was founded in the WDTX and maintains a registered address here. ECF No. 34 at 15 n.3. Google argues that since the NDCA is home to the company personnel with relevant information as well as documentary evidence in this case, the NDCA has a “far stronger local interest in the case than the Western District of Texas. ECF No. 14 at 12. However, this argument understates the global reach of Google’s products and in particular its connection to the state of Texas. Not only did the alleged acts of infringement occur in this district, but Google also has an office in the Western District in Austin. ECF No. 34 at 15, Ex. I. Both districts have a local interest, making this first public interest factor neutral.

b. The “court congestion” factor weighs against transfer.

The relevant inquiry under the “court congestion” factor is “[t]he speed with which a case can come to trial and be resolved.” *Genentech, Inc.* 566 F.3d at 1347. Google uses statistics spanning the last decade to argue that the NDCA provides a faster median time to jury trial than the Western District of Texas. ECF No. 14 at 13. This argument fails for two reasons.

First, this Court has only existed for the last three years, making the previous seven years of data wholly irrelevant. During the past three years, this Court has consistently brought intellectual property cases to trial at an efficient rate. Recent data shows that “for patent cases since 2016, the average time to trial in NDCA was 34.1 months.” *Demaray LLC v Samsung Electronics Co., et al.*, No. 6-20-CV-636-ADA, ECF No. 115 at 11 (W.D. Tex. Jul. 1, 2021). By contrast, this Court’s Order Governing Proceedings – Patent Case (“OGP”) sets patent cases for trial at 52 weeks after *Markman* hearings. Despite the large number of cases pending before this Court, the Court has been able to bring patent cases to trial approximately in accordance with its guidance in the OGP. *See, e.g., CloudfChange, LLC*, 2020 WL 6439178 (20.3 months from case filing to trial); *VLSI Technology LLC v. Intel Corporation*, No. 6-21-CV-00057 (W.D. Tex., filed Apr. 11, 2019) (22.4 months from case filing to trial); *Freshub, Inc. et al v. Amazon.Com Inc. et al*, No. 6-21-CV-00511 (W.D. Tex., filed Jun. 24, 2019) (23.7 months from case filing to trial); *ESW Holdings, Inc. v. Roku, Inc.* No. 6-19-CV-00044 (W.D. Tex., filed Feb. 8, 2019) (25.9 months from case filing to trial). Therefore, the time to trial for patent cases in the Waco Division is almost 12 months shorter on average than in the NDCA.

Second, the trial backlog in NDCA caused by courthouse closures due to the COVID-19 pandemic beginning in March 2020 would make the time to trial for patent cases, and all cases in general, even longer. Civil trials have been temporarily suspended in NDCA due to COVID-19 at the time Google filed its motion. ECF No. 34 at 8. By contrast, this Court conducted its first

patent jury trial during the COVID-19 pandemic in October 2020, and has since conducted at least seven jury trials, six of which are patent jury trials. In the first half of 2021 alone, this Court has already conducted five patent jury trials in the Waco courthouse. Taking these into consideration, the differences in average time to trial in this Court and the NDCA could be much longer than 12 months.

Due to the advanced nature of this litigation, and the parties' agreement to reuse discovery evidence from the EDTX action, trial is approaching. Transfer to the NDCA would only cause further unnecessary delay, and therefore weighs against transfer.

c. The remaining public factors are neutral.

Familiarity with the governing law is neutral as both the NDCA and the WDTX are well versed in patent law. Additionally, there are no issues regarding conflict of laws. Therefore, both factors are neutral.

IV. CONCLUSION

Google met its preliminary burden to show that the Northern District of California is a proper venue for this lawsuit. However, the balance of the *Volkswagen* test weighs against transfer. No factors favor transfer, and two factors weigh against it. The other remaining factors are neutral. Therefore, Google did not meet its burden of proof under the *Volkswagen* test to show that the Northern District of California is clearly more convenient. Its Motion to Transfer is therefore **DENIED**.

SIGNED this 15th day of September, 2021.



ALAN D ALBRIGHT
UNITED STATES DISTRICT JUDGE

PROOF OF SERVICE

I hereby certify that I electronically filed the foregoing with the Clerk of the Court for the United States Court of Appeals for the Federal Circuit by using the appellate CM/ECF system on October 15, 2021.

A copy of the foregoing was served upon the following counsel of record and district court via an express carrier:

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I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

Dated: October 15, 2021

/s/ Bradley N. Garcia
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